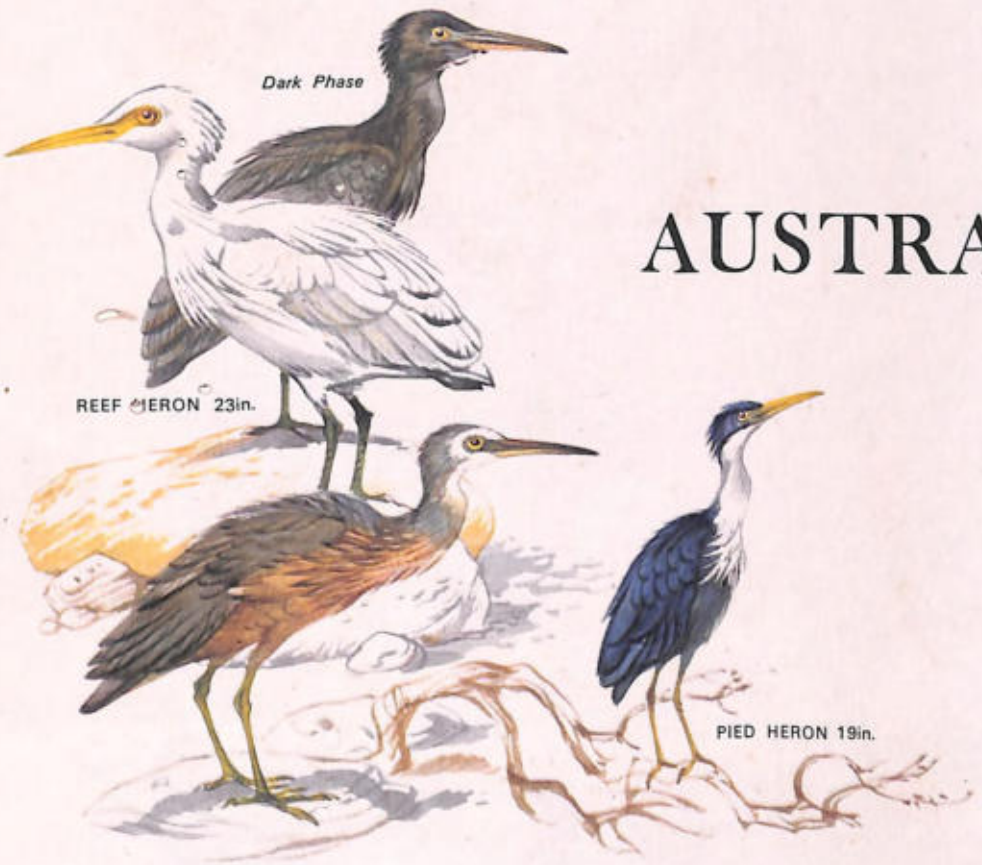
# AUSTRALIAN BIRDS




ZOOLOGICAL GARDEN
623/2

PINK COCKATOO 16in.

# AUSTRALIAN BIRDS

## ROBIN HILL

ZOOLOGICAL GARDENS
6236
CALCUTTA
ALIPORE

BOOK NO.
608

*with a foreword by*

THE PRINCE PHILIP
H.R.H. THE DUKE OF EDINBURGH

NELSON
1967

GREAT-BILLED HERON
41in.

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30in.

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For my parents: Russ and Blue

*Qui semper confidedant nuper animum confirmabant*

ZOOLOGICAL GARDEN (CALCUTTA) ALIPORE (6234)

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COLLARED SPARROWHAWK

BLACK-SHOULDERED KITE 12½in.

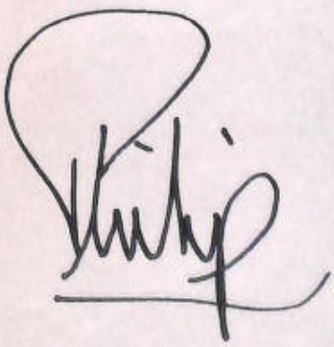
# FOREWORD

Painting wild animals, and particularly birds, is the most exacting branch of the art. Photography cannot compare with the work of an accomplished artist, and the discipline of faithful yet aesthetic presentation of the subjects demands a very special talent.

Robin Hill's work is in line with the great bird painters of the world and it betrays the same painstaking research in the field and inspiration in the studio.

Australia is fortunate to have such an artist working at this time when there is a growing interest in the natural history of the continent and particularly in its very rich bird life.

I hope this splendid book will have the success it deserves and help to encourage even more Australians to appreciate the scope and variety of the natural background to their lives.



H.R.H. THE DUKE OF EDINBURGH

KOOKABURRA (LAUGHING) 17½in.

INLAND DOTTEREL 8in.

KOEL 18in.

# PREFACE

There are over seven hundred species of birds in Australia and many of these are unique to the Australasian regions. Their enormous variety of size, form and colour and their fascinating behaviour—about which much is still unknown—makes Australia a most exciting area, both for the bird-watcher and his more professional counterpart the ornithologist.

It is, therefore, not surprising that there is an increasing interest being taken in our birds, and a corresponding desire for books on the subject. What is surprising, perhaps, is the paucity of literature on Australian birds. A number of publications do exist. These range from really first-rate scientific treatments, usually of restricted localities or groups, down to extraordinarily unsatisfactory books, which are of no use in the field and no addition to the collections of the bookish amongst us. Above all, nobody to my mind, except perhaps Gould, has given any real impression of the visual excitement of the bird-life in this country. Even the best of the books readily available are rather poorly illustrated.

Early in this century, Gregory Mathews produced his multi-volume work on the subject. Most of the plates in this are very accurate and usually most decorative, but they suffer from a kind of dusty greyness, even at their brightest. All criticisms of this kind tend to be subjective, but I feel that Mathews' plates have an Edwardian pastel-quality, a refinement but a deadness, that does not do justice to the warmth and brilliance of birds. It should be added that this grey look is, to a large degree, inherent in hand-coloured lithography.

The great and indefatigable Mr. Gould also produced, amongst many other things, a large multi-volume work on the birds of Australia. These are indeed, a set of very beautiful bird prints, which are rather more exciting than the Mathews plates. The best of Gould's are well worth the very high prices they bring at auctions.

Not very many years ago, a well-bound set of Mathews' *Birds of Australia* was worth about $A800. Today a similar set could easily bring $A2,000, although they very seldom appear for sale. Gould's plates, bound or unbound, cost far more: from $A8,000-$A12,000 would not be unlikely prices.

So it will be seen that any kind of full treatment of Australian birds is out of reach for most of us. Even coming down the scale somewhat, a volume like Neville Cayley's on the parrots, is out of print, rare, and worth upwards of $A60.

Considering all these facts it appears obvious that there is a great void in the world of Australian bird books, both from the point of view of a full textual coverage and also a visual presentation that gives some idea of their beauty. I hope that this present volume will go some small way towards filling that void.

I suppose my basic reason for making this book is that I enjoy painting and writing about wildlife—and publishing a book is one way of earning a living. A less personal reason, but one which I feel strongly about, is to make more people aware of our bird-life, and thus, one hopes, excite them into taking an interest in conservation. The more we know about our wildlife and vegetation, the greater the likelihood of our wanting to preserve it, both for posterity and ourselves.

How many people in this country today would shoot a koala or trap a platypus for its silky fur? But except for publicity and the dissemination of knowledge about these two animals, I feel sure that even now we would not be so public-spirited about them. Our lack of real enlightenment is perhaps indicated by the great inroads we are still making on much of our wildlife. The depredations are more subtle these days—for instance, in 1927, 600,000 koalas were slaughtered for the fur trade—but at the same time more insidious and even more effective. Such activities as the destruction of habitat and the use of various highly toxic chemical pesticides and herbicides, are doing more lasting damage than most hunters have done in the past.

So apart from any aesthetic appeal this book might have, I hope it will also help to make people more aware. Aware that is, of how interesting and valuable our birds are, and how well worth preserving, even at the cost of leaving a few acres unbuilt upon, a few 'useless' swamps undrained, and some remnants of forest unfelled.

Many aspects of Australian ornithology are still in a formative stage, and there is a great deal of information lacking about a large number of our birds: information of a kind that has been available for many years about the birds of such countries as England and America.

For example, the breeding season of many Australian birds is not completely known. In a country as large as this, a species which inhabits both the northern and southern latitudes is going to be affected by quite different seasons.

Our tropical birds, especially in the drier areas, tend to regulate their breeding times to the wet season, nesting after good rains. As more information becomes available over the years, we are discovering that many of the accepted breeding months apply only to the southern and eastern populations of birds.

Another problem that arises when one comes to making a bird book in this country, is that of nomenclature, both in the vernacular and the scientific names. Because taxonomists are still working on various species, trying to reach an agreement about the birds' relationships, changes are frequently made in Australian classification. This situation is aggravated, and partly caused by the fact that there are a number of taxonomically obscure birds in this country.

The vernacular or common names of some Australian birds are also confusing, largely because of the abundance of alternative names for some species and the use of the same name for different birds. With very few exceptions, I have given neither local names nor nick-names, as I feel it would be better to forget most of them altogether. It is hard enough for people to find out about birds without having to wonder whether a reference to the 'apostle-bird' is being applied to the chough, the two babblers, or the real Apostle-bird.

However, some of the birds in this book are given two names. Both of these are 'accepted', and the second name is generally a newer one introduced, in many cases, because it is more descriptive of the bird.

I hope that this book will fulfil a number of functions in varying degrees. To some extent this is a reference book. The specific treatment of each bird tends to follow a pattern, with a brief note on distribution, habitat, habits and nesting. One does not, of course, *read* this kind of thing in the normal sense, but rather, looks up a particular bird. For this reason, such information as nest and egg descriptions are usually repeated even when they are very similar to those of the preceding bird.

There is, however, an introduction to each group. This is a more general essay and, one hopes, a readable account of the birds, rather than strict reference matter. In some cases, where the birds are particularly interesting—for example the parrots or the birds of paradise—this introduction is quite extensive.

Although this volume is in no sense a field-guide to be taken on birding trips, it is hoped that any bird noted down whilst one is out of doors can be identified later from the illustrations. The birds are only to scale within each picture, not throughout the book as a whole. The sizes are approximate, and not broken down beyond half-inch divisions.

At the back of the book will be found a corrigenda containing, for the most part, corrections of scientific names that occurred in the first sixty-four pages of text, due to a misapprehension on the part of the author and the editors. Should *Australian Birds* go into a second printing these errors will be corrected in the text.

Another problem in compiling a large work is the omission of text. A number of species have been missed in the body of the book, but these will be found in the corrigenda. Perhaps I should also say that I would take it kindly should anybody write to me, pointing out any errors or inconsistencies they might find.

One does not produce a book containing upwards of 150,000 words and a thousand or so bird drawings *in vacuo*, and indeed I am indebted to a number of people for their help and encouragement. Firstly I would like to thank Allan McEvey and Claude Austin, who, between them, have read the mountain of manuscript.

Mr. Allan McEvey is Curator of Birds at the National Museum in Melbourne and is an extremely busy gentleman, yet he has found time to make many suggestions, guide me to esoteric publications I would not otherwise have found, and given me the benefit of many formative conversations on and around the subject of birds.

Mr. Claude Austin, who must be one of the most travelled bird-watchers within this continent, has also made many valuable suggestions, particularly on the Passerine birds. His extensive field-trips have given him a particular knowledge of the distribution and habits of many species, and this information he has freely passed on to me.

It must be said that in some cases I have not, for technical reasons, been able to follow all the advice of these worthy gentlemen, and of course any sins of omission or commission must be laid at my door and not theirs.

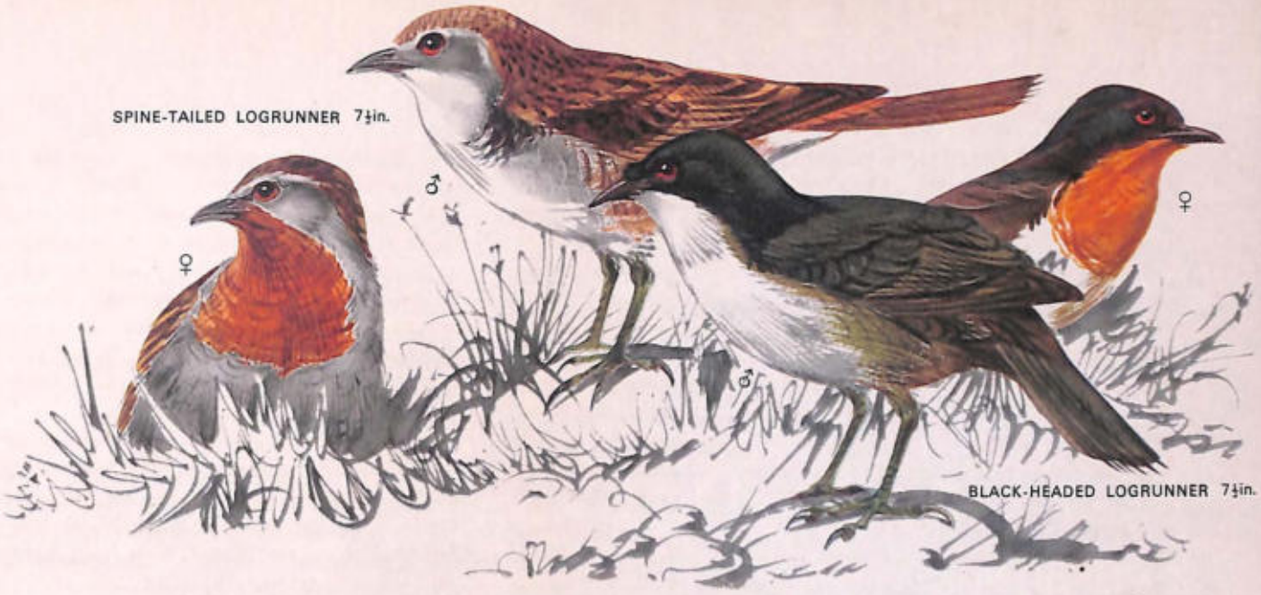
As mentioned earlier, there are a number of excellent regional bird books and also some very good monographs on groups of birds, such as the honeyeaters and the finches. Such of these which have been of particular use I have mentioned specifically in the bibliography and I would like to take this chance of thanking those authors to whom I have not personally written.

As reference material for the artwork, I have used my own field-sketches and bird-skins generously made available to me through the cooperation of The Director of the National Museum of Victoria. The plates and descriptions in various old bird books and numbers of photographs have also been used. Although I seldom copy a photograph exactly I have used the work of those two excellent wildlife photographers Graham Pizzey and Michael Morcombe in some degree, for which I extend my thanks. I hope that they, and anyone else who may recognize some nuance from one of their photographs, will consider the use to which I have put them, not impertinent to our common interest in nature.

Robin Hill.

1967

ZOOLOGICAL GARDENS ALIPORE CALCUTTA 623(7)




# THE CLASSIFICATION OF BIRDS

*In the following essay into the problems of classification, the works of many ornitholigists have been drawn upon. The author is not a taxonomist and so has no significant views on, nor any predilection to, classification. It would seem, however, that the following compilation and precis of past and current views would be of considerable value and interest to both professional ornithologists and amateur 'bird-watchers'.*

Taxonomy is the science whereby the organisms of the natural world are classified. This is one of the most fundamental of all the sciences and one which deals with the problem of resolving biological phenomena into an orderly system. Classification is thus the naming and describing of all plants and animals and the arranging of them into some logical relationship.

The diversity of the organic world is indicated by the fact that there is approximately one third of a million known species of plant life and about one million known species of animal. (Perhaps it should be stated that, to the biologist the term animal signifies all life higher than plants.) With sub-species added, there are more than two million animals named, and new ones are being described at about ten thousand a year.

In the case of birds—the Class *Aves*—there are something like 8,000 living species in the world. Until ornithologists and taxonomists had reduced this vast assortment to some semblance of order, and discovered, so far as is possible, their relationships, significant work in non-taxonomic fields was hampered or even impossible.

A number of people have concerned themselves with this problem of classification since the middle of the eighteenth century. Linnaeus, the Swedish naturalist, was one of the first scientists to make a systematic approach to the classification of living things. Before him, there had been few attempts to establish a 'correct 'name for any species or to discover the relationships between species, genera and larger groups, although there was recognition of the categories *genus* and *species*. In the Middle Ages, in Europe, Latin was the international language of scholars and the majority of scientific works were written in this language. Our present scientific nomenclature is a legacy from the naturalists who wrote during the sixteenth, seventeenth and eighteenth centuries.

Although the pre-Linnaean naturalists were able to read each other's works, they were not consistent in the names they gave to plants and animals. These labels ranged from what have been termed uninominals (a generic name only) and binominals (generic name and one trivial, that is, descriptive name) to polynominals which carried any number of trivial names. The extent to which this was carried is illustrated by the example of the honey-bee which became, *Apispubescens, thorace subgriseo, abdominae fusco, pedibus posticis glabris utrinque margine ciliatis:* and another naturalist might give the bee a different name.

The reason for this confusion was that the authors were attempting to both name and describe a species at the one time. These phrase-names soon became so elaborate and unwieldy that there arose the necessity for simple labels for each species. Linnaeus eventually introduced his system of strictly binominal labelling—a single *nomen triviale* to be added to the generic name of each species. The honey-bee thus has the much more manageable name of *Apis mellifera.*

This greatly simplified binominal approach was readily accepted by all zoologists. Linnaeus himself first applied it consistently in 1758 in the tenth edition of his *Systema Naturae*, which has become the starting point for all international scientific nomenclature.

In the application of vernacular names we still suffer from the pre-Linnaean malaise of multiplicity. Australian bird names, for example, proliferate for some species. The bird that bears the 'accepted' vernacular name of Grey-crowned Babbler is also quite commonly known as Apostle-bird, Chatterer, Cackler, Catbird, Codlin-moth-eater, Hopper, Arco and Happy Family Bird.

It is quite obvious that for scientific purposes such a bird requires some label apart from all this. *Pomatostomus temporalis*, although it may be somewhat frightening to the layman, is at least universal, it is also almost unalterable, for to maintain this international nomenclature in as concrete a state as possible, a strict rule of precedence is adhered to: the name given in the first scientific and published description is seldom altered—even if later knowledge proves the name to be misleading or even incorrect.

This was not always so, however. When the Linnaean system had been adopted by virtually all scientific authors, after about 1800, a new difficulty arose. As the system stood, an author was free to change a name if he considered it to be incorrect for some reason such as unsound etymology. Great confusion arose from this, and it became obvious that there was need for a definite set of rules in nomenclature.

At first, committees were formed in different countries to set out local rules, but towards the end of the nineteenth century scientists began to consider it an international

matter. So in Paris in 1889, the first meeting was held of the newly created International Zoological Congress and this was the beginning of the present International Rules. These rules have now become absolute and govern scientific nomenclature all over the world.

Although it is now no easy matter to change the name of a plant or animal, the term Colymbiformes is one interesting example of an ordinal designation that has been changed—in fact discarded. It is derived from the generic name *Colymbus* given by Linnaeus in 1758, but ever since, there has been doubt about the birds to which he gave the name. Old World ornithologists maintained that it applied to the Divers, and New World ornithologists used the name for Grebes. At the International Commission on Zoological Nomenclature in 1956, it was recommended that the name be dropped altogether and now the generic name for Divers is *Gavia* (Forster 1788) and for Grebes, *Podiceps* (Latham 1787). A further note arises on the etymology of *Podiceps* and *Podicipedidae* (*Podicipidae*/*Podicipitidae*).

The grebes have their legs placed very far back on their bodies and from the sixteenth to the eighteenth century or so, their colloquial English name was 'arse-foot' or 'arsfoot'. Johnson has the term in the early editions of his dictionary and it still remained (as a footnote) in the 1953 edition of Webster's Dictionary.

At the time, authors on birds Latinised the word quite appropriately as *Podicipes*, and Catesby in 1731 wrote his notes on the Pied-billed Grebe, under the name '*Prodiceps Minor*'—erroneously inserting an '*r*'. It was on Catesby's account of this grebe that Linnaeus established his specific name for the Pied-billed Grebe twenty-seven years later. It was here that the confusion arose as Linnaeus, correcting the Catesby spelling at one end of the word, made an error of his own at the other. He spells the word *Podiceps* instead of *Podicipes*, which is the correct Latin form.

John Latham, another early worker in taxonomy, proposed the genus *Podiceps* for the grebes, basing his name on that of Linnaeus. Various authors pointed out the sources of this spelling error early on but more recently it has been overlooked, with the consequence that there has been much argument over the correct spelling.

The terminal Latin root of *Podiceps* is a contraction of pes, pedis, so it is evident that the correct form for the family name is *Podicipedidae* and not *Podicipidae* or a number of others which have been used.

Ordinal names are not regulated by the International Code, so in a case such as the above, workers are (unfortunately) free to spell the name of the Order in accordance with one or another view of the etymology. The incorrect 'Podiceps' however, has to be retained under the rules of precedence.

With complexities such as this, even in the scientific names, it will be seen that, were ornithologists to depend on vernacular names, confusion would oft be worse confounded.

As a rule, systematic classification aims to do two important jobs: to keep related groups as approximated as possible, and to put ancient, ancestral groups at the beginning of the family tree and derived groups towards the end.

A basic difficulty (or even contradiction) in the classification of the Class *Aves*, or, any animals, in fact, is the unsatisfactory procedure of aligning groups in linear order that actually have a three dimensional relationship with each other.

The accompanying diagram shows the layout of the 'family tree' of a bird about which there is no contention as to how the species relates to the whole Class *Aves*. In many cases the question of the relationships between the Orders of birds is a very vexed one and may never be solved to complete satisfaction.



The problems of connections and derivations of Orders are further aggravated by a great deal of convergent evolution. (A physical similarity between forms that are not actually closely related.) The predators, the birds of prey, for example, all have hooked bills and sharp talons, but it is now generally accepted that hawks and owls are not particularly closely related. There is actually some evidence to suggest that even the hawks are not all as closely related to each other as may appear (Hudson 1948).

An opposite development, which confuses the issue is the evolution of such groups as the Sphenisciformes (Penguins) and the Procellariiformes (Petrel–Albatross complex) which appear to be vastly different but are shown to be related on closer anatomical examination.

However, broadly speaking, the arrangements of Families and Orders is fairly well sorted out and the Alexander Wetmore classification, to the ordinal level, is typical of what is more or less accepted as a standard.

It is when we delve further, to the level of genera, that contention arises and this is particularly true within the last of the Orders, the Passeriformes or perching birds.

This enormous group contains over half the living avian species of the world. The first broad divisions present few problems. As long ago as 1847, Johannes Müller subdivided the Passerine birds on the basis of the musculature of the syrinx or voice-box. He arrived at four sub-Orders, the first three of which have simple muscular arrangements working the syrinx, and are considered to be the more primitive Passerines: these are known as the sub-Oscines. The remainder of the species, about 4,000, are contained in the Oscines or 'true singing birds'.

They have developed, and are still developing, very many types, and thus the limitations of the necessarily linear arrangement of classification show up greatly. A phylogenetic model of the Oscines should perhaps resemble an umbrella rather than a series of separated linear relationships.

One difficulty is the large amount of parallel development in unrelated species, which can cause quite unrelated birds to appear remarkably similar. It seems that, in spite of the Oscines' basic uniformity, the investigation of previously unexplored anatomical features will continue to shed new light on the classification of song-birds.

The shape of the bill has been used a great deal in the past to classify birds although it is not necessarily a reliable basis from which to work. In fact the bill is one of the most readily adaptive parts of a bird and there is evidence to suggest that what might be called 'shrike-like', 'warbler-like', or 'flycatcher-like' bills have been aquired by various unrelated groups of Oscines.

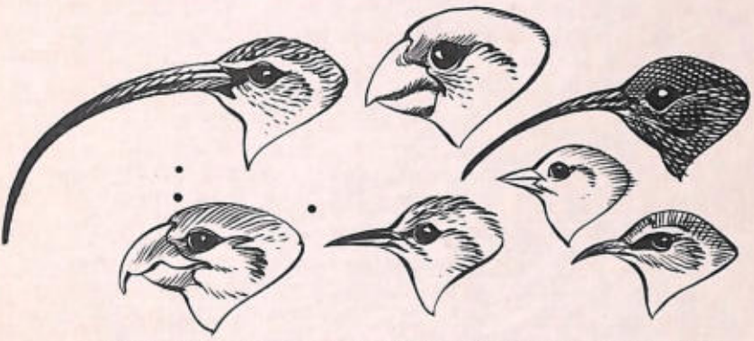
'Darwin's Finches' are a perfect example of how readily bills will adapt, growing into entirely different shapes within a related group of birds; a phenomenon illustrating the principle of adaptive radiation: this is the spread of a single ancestral line of animals into different ecological niches.

These finches are a family called the *Geospizinae*, a group of small birds which inhabits the Galapagos Islands. Similar enough to be recognized as the one family, they have apparently descended (relatively recently) from the one source. The original finches populating the islands found themselves without competition for a wide variety of environmental niches, and so gradually they 'radiated', adapting to various modes of existence. Their bills varied correspondingly, and so today some of these finches are still seed-eaters, while others feed on insects, others on cactus, and one form has even developed some of the habits of a woodpecker.

This last bird is particularly interesting in that it is believed to be the only bird which uses a tool to obtain its

food. With a small twig or a cactus spine it prods down into holes too deep for its bill and prises out the wood-borers and other grubs.

There is an even better example of adaptive radiation found in the *Drepanididae* of the Hawaiian Islands. The parent stock of these birds is uncertain, but it was probably some bunting, tanager, honeycreeper or finch-like American species. Finding room for expansion, this original type evolved into a considerable family. Eight of these are extinct (mostly the over-specialized species) but fourteen are still living. Their bill development is quite extraordinary, as will be seen from the illustration.



Only two or three of the Oscine families are reasonably well defined. In most recent classifications it is considered that the larks and the swallows are aberrant in various ways.

The larks differ from other Oscine birds in that the back of the tarsus (the exposed part of the leg) is broken up into plates; and there are also some different internal features. The swallows have the bronchial rings more or less complete, whereas the other Oscines have half-rings with a membrane across the inner face. For the remainder, consistent family characteristics are hard to find.

The classification of Oscines by Stejnegar, followed to a considerable extent by Wetmore, places great importance upon the reduction or absence of the outer primary. Most of the sub-Oscines certainly do have a long tenth primary, but on the other hand, reduction of this feather in the higher Passerines is by no means consistent. It is present or absent from genus to genus in such families as the *Bombycillidae*, the *Dicaeidae* and the *Sturnidae*. And then the apparently primitive larks have the tenth primary much reduced or even vestigial while some highly specialized families, such as the *Nectariniidae*, have this wing-feather only moderately developed. So it will be seen that the nine-primaried families are not always the most sophisticated song-birds.

Before the detailed arrangement of a sequence can be considered, it is necessary to decide on the overall pattern. Mayr and Greenway in a paper on the *Sequence of Passerine Families* dispose first of the swallows and larks. These two families out of the way, they go on to discuss the rest, grouping the remainder of the song-birds as follows: 1. Old World insect-eaters and their relatives (*Campephagidae*, *Pycnonotidae*, *Sylviidae*, *Timaliidae*, *Turdidae*, *Muscicapidae*, etc.). 2. The New World insect-eaters and finches. 3. Crows, birds of paradise and related families. Any peculiar families and the Old World nectar-eaters are grouped with varying degrees of felicity within this broad framework.

It will be found that the sequence of these three groups is by no means settled amongst taxonomists, quite apart from differing views on arrangement within the groups. Taking the number of primaries as significant would impose the order 1.3.2. This was first proposed by Wallace in 1874, as far as is known. This system has been followed in certain sections of *The Catalogue of Birds* in the British Museum.

The sequence 3.1.2, crows at the bottom and finches at the top of the evolutionary tree, was used by Wetmore and Miller in their classification of 1926. It has since been the system on which the American Ornithologists' Union based its 1931 checklist.

It is virtually impossible to satisfactorily classify as 'primitive' or 'specialized' the exceedingly similar groups of song-birds. But the *convenience* of placing the rather undifferentiated Old World insect-eaters near the beginning, is now being adopted by most taxonomists. It is whether to follow 1.2.3 or 1.3.2 that constitutes the main problem. That is to say, are the finches or the crow/bird of paradise group relatively more specialized? The answer to this depends entirely on the criteria used by the classifier. If the adaptation to a seed-diet or the reduction of the tenth primary feather are taken to signify sophistication, then the sequence 1.3.2 will no doubt be the outcome. However, if the cerebralization of the *Corvidae* and the extraordinary courtship habits of the birds of paradise and bower-birds are taken as indications of evolutionary advancement, then the sequence 1.2.3 will be preferred.

It is worth noting the recent realization that the 'finches' (lumped together because of their cone-bills) actually form an artificial and polyphyletic group. This of course weakens the case for the arrangement 1.3.2.

Weighty evidence can also be brought against sequence 1.2.3. As Alexander Wetmore points out, to consider the cerebralization of the crows as a very important characteristic indicates a somewhat anthropomorphic bias. Further argument against 1.2.3 is that high cerebralization has also occurred among non-Passeres (Psittaciformes, for example) and the relationship between the *Corvidae–Paradisaeidae Ptilonorhynchidae* group is not absolutely established. Thus we come back to the beginning—there is at present no decisive criterion by which we might come to an unequivocal conclusion about the classification of birds.

CLASS AVES : BIRDS

SUB-CLASS : ARCHAEORNITHES
Ancestral Birds (Fossil)

SUB-CLASS : NEORNITHES True Birds
SUPER-ORDER : NEOGNATHAE Typical Birds
ORDER : PASSERIFORMES Perching Birds

SUB-ORDER : TYRANNI
Oven-birds, Tyrant Flycatchers and Allies.

SUB-ORDER : EURALAIMI
Broadbills

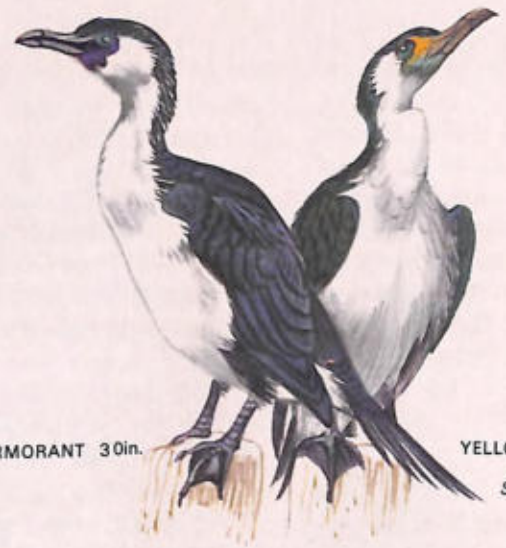
SUB-ORDER : MENURAE
Lyrebirds

SUB-ORDER : PASSERES
Songbirds
FAMILY : Meliphagidae Honeyeaters
GENUS : Anthochaera Wattle-birds

SPECIES
A. chrysoptera
Little Wattle-bird

SPECIES
A. carunculata
Red Wattle-bird

SPECIES
A. paradoxa
Yellow Wattle-bird



BLACK-FACED CORMORANT 30in. YELLOW-FACED CORMORANT 30in.

*Summer*

# SOME CLASSIFICATIONS OF BIRDS

The following lists represent current classifications of the birds of the world, according to the views of various ornithologists and taxonomists. Each of the authors is a leading authority on the subject, and yet it will be seen that in quite a number of cases they do not agree. Orders may be placed in different sequence and, especially within the Passeriformes, considerable variation in the arrangement of families will be noticed. Further disagreement arises about whether some groups of birds should, or should not, be included within certain families.

These somewhat arbitrary variations, arise largely from the fact that ornithologists stress different aspects of bird morphology and behaviour, in relating or separating bird groups. Some of the attitudes to this problem are discussed in the introduction to this section.

Each classification set out below is accompanied by a short note and the name and professional position of its author. Also, relating to some of the Orders, families and genera, will be found an explanation as to why the group has been so placed. These explanations are extracted from notes by the authors.

Sharpe's *Handlist of the Genera and Species of Birds* was the only standard scientific catalogue of the birds of the world until Peters commenced his large work on the subject, the first volume of which was published in 1931. At the same time, a number of other workers were tackling the problem, among them, Alexander Wetmore, and it was on a list proposed by Wetmore that Peters based his families and higher groups. The arrangement by Peters, of sub-families and the sequence of genera and species, was drawn from his own work and other sources.

Peters worked on his classification until his death, at which time he had progressed as far as the first volume of the Passeriformes. At this point the job was undertaken by various leading taxonomists, for example, Dillon, Ripley, Mayr, Greenway and others. The work is still in process, and odd volumes are published as they are completed by specialists in various groups.

The checklists which follow, commence with J. L. Peters', as it is one of the earliest classifications still affecting the taxonomic views of today. Various checklists of the birds of the world follow, and then comes a classification of the Order Passeriformes, as these present particular problems.

As illustrations of local checklists, examples from Britain and Australia are given, including the 'official' 1926 R.A.O.U. Australian checklist, and one regional list, for South Australia, as an example of a more modern classification of Australian birds.

## AN ORDINAL CLASSIFICATION OF BIRDS

*James Lee Peters*

*One-time Curator of Birds, Museum of comparative Zoology, Harvard*

| ORDERS | |
|---|---|
| Struthioniformes | Ostriches |
| Rheiformes | Rheas |
| Casuariiformes | Cassowaries and Emus |
| Dinornithiformes | Moas (Extinct) |
| Aepyornithiformes | Elephant-birds (Extinct) |
| Apterygiformes | Kiwis |
| Tinamiformes | Tinamous |
| Sphenisciformes | Penguins |
| Gaviiformes | Divers (Loons) |
| Colymbiformes | Grebes |
| Procellariiformes | Petrels and Albatross |
| Pelecaniformes | Pelicans, Tropic-birds, Gannets, Cormorants, Darters and Frigate-birds |
| Ciconiiformes | Herons and allied birds, Storks, Ibis, Spoonbills, Flamingos |
| Anseriformes | Ducks, Geese and Swans |
| Falconiformes | Birds of Prey |
| Galliformes | Megapodes, Grouse, Curassows, Pheasants, Quail, etc. |
| Gruiformes | Cranes, Rails, Rail-like birds, etc. |
| Diatrymiformes | (Fossil) |
| Charadriiformes | Waders |
| Columbiformes | Pigeons and related birds |
| Psittaciformes | Parrots |
| Cuculiformes | Cuckoos, Plantain-eaters |
| Strigiformes | Owls |
| Caprimulgiformes | Oilbirds, Nightjars |
| Apodiformes | Swifts, Hummingbirds |
| Coliiformes | Colies, or Mousebirds |
| Trogoniformes | Trogons |
| Coraciiformes | Kingfishers, Todies, Motmots, Bee-eaters, Hoopoes, Hornbills |
| Piciformes | Jacamars, Puffbirds, Barbets, Honeyguides, Woodpeckers, Toucans and allied birds |
| Passeriformes | Perching birds |

# REVISED CLASSIFICATION FOR THE BIRDS OF THE WORLD

Alexander Wetmore, 1960
*Research Associate, Smithsonian Institution, Washington*

Wetmore's classification is one of the most widely accepted, particularly in his sequence of Orders. Most authorities differ but slightly up to this point. Below the Orders, in the placement and division of families and genera, Wetmore is no more 'standard' or totally acceptable than the other classifications shown in these pages.

CLASS Aves, Birds.
[Sub-class Archaeornithes, Ancestral Birds (fossil).]
[ORDER Archaeopterygiformes, Archaeopteryx, Archaeornis (fossil).]
[FAMILY Archaeopterygidae, *Archaeopteryx*, *Archaeornis* (fossil).]

Sub-class Neornithes, True Birds.
[ORDER Hesperornithiformes, *Hesperornithes* (fossil).]
[FAMILY Hesperornithidae, *Hesperornis* (fossil).]
[FAMILY Enaliornithidae, *Enaliornis* (fossil).]
[FAMILY Baptornithidae, *Baptornis* (fossil).]

[ORDER Ichthyornithiformes, *Ichthyornithes* (fossil).]
[FAMILY Ichthyornithidae, *Ichthyornis* (fossil).]
[FAMILY Apatornithidae, *Apatornis* (fossil).]

ORDER Sphenisciformes, Penguins.
FAMILY Spheniscidae, Penguins.

ORDER Struthioniformes, Ostriches.
[FAMILY Eleutherornithidae, *Eleutherornis* (fossil).]
FAMILY Struthionidae, Ostriches.

ORDER Rheiformes, Rheas.
FAMILY Rheidae, Rheas.

ORDER Casuariiformes, Cassowaries, Emus.
FAMILY Casuariidae, Cassowaries.
FAMILY Dromiceidae, Emus.
[FAMILY Dromornithidae, *Dromornis* (fossil).]

[ORDER Aepyornithiformes, Elephantbirds (fossil and sub-fossil).]
[FAMILY Aepyornithidae, *Aepyornis* (fossil and sub-fossil).]

[ORDER Dinornithiformes, Moas (fossil and sub-fossil).]
[FAMILY Dinornithidae, *Dinornis* (fossil and sub-fossil).]
[FAMILY Anomalopterygidae, *Anomalopteryx*, *Emeus*, and Allies (fossil and sub-fossil).]

ORDER Apterygiformes, Kiwis.
FAMILY Apterygidae, Kiwis.

ORDER Tinamiformes, Tinamous.
FAMILY Tinamidae, Tinamous.

ORDER Gaviiformes, Loons.
FAMILY Gaviidae, Loons.

ORDER Podicipediformes, Grebes.
FAMILY Podicipedidae, Grebes.

ORDER Procellariiformes, Albatrosses, Shearwaters, Petrels, and Allies.
FAMILY Diomedeidae, Albatrosses.
FAMILY Procellariidae, Shearwaters, Fulmars, Petrels.
FAMILY Hydrobatidae, Storm Petrels.
FAMILY Pelecanoididae, Diving Petrels.

ORDER Pelicaniformes, Tropicbirds, Pelicans, Frigate-birds, and Allies.

[SUB-ORDER Odontopteryges, Odontopteryx, and Allies (fossil).]
[FAMILY Odontopterygidae, *Odontopteryx* (fossil).]
[FAMILY Pseudodontornithidae, *Pseudodontornis*, *Osteodontornis* (fossil).]
[SUB-ORDER Phaethontes, Tropicbirds.
FAMILY Phaethontidae, Tropicbirds.
SUB-ORDER Pelecani, Pelicans, Boobies, Cormorants, Snake-birds.
FAMILY Pelecanidae, Pelicans.
[FAMILY Cyphornithidae, *Cyphornis*, *Palaeochenöides* (fossil).]
[FAMILY Pelagornithidae, *Pelagornis* (fossil).]
FAMILY Sulidae, Boobies, Gannets.
[FAMILY Elopterygidae, *Elopteryx*, *Eostega*, *Actiornis* (fossil).]
FAMILY Phalacrocoracidae, Cormorants.
FAMILY Anhingidae, Snake-birds.
SUB-ORDER Fregatae, Frigate-birds.
FAMILY Fregatidae, Frigate-birds.
[SUB-ORDER Cladornithes, Cladornis and Cruschedula (fossil).]
[FAMILY Cladornithidae, *Cladornis*, *Cruschedula* (fossil).]

ORDER Ciconiiformes, Herons, Storks, and Allies.
SUB-ORDER Ardeae, Herons, Bitterns.
FAMILY Ardeidae, Herons, Bitterns.
FAMILY Cochleariidae, Boatbilled Herons.
SUB-ORDER Balaenicipites, Whale-headed Storks.
FAMILY Balaenicipitidae, Whale-headed Storks.
SUB-ORDER Ciconiae, Storks, Ibises, Spoonbills.
FAMILY Scopidae, Hammerheads.
FAMILY Ciconiidae, Storks, Jabirus.
FAMILY Threskiornithidae, Ibises, Spoonbills.
SUB-ORDER Phoenicopteri, Flamingos.
[FAMILY Agnopteridae, *Agnopterus* (fossil).]
[FAMILY Scaniornithidae, *Scaniornis*, *Parascaniornis* (fossil).]
FAMILY Phoenicopteridae, Flamingos.
[FAMILY Palaelodidae, *Palaelodus*, *Megapaloelodus*, *Telmabates* (fossil).]

ORDER Anseriformes, Screamers, Ducks, Geese, Swans.
SUB-ORDER Anhimae, Screamers.
FAMILY Anhimidae, Screamers.
SUB-ORDER Anseres, Ducks, Geese, Swans.
[FAMILY Paranyrocidae, *Paranyroca* (fossil).]
FAMILY Anatidae, Ducks, Geese, Swans.

ORDER Falconiformes, Vultures, Hawks, Falcons.
SUB-ORDER Cathartae, New World Vultures.
[FAMILY Neocathartidae, *Neocathartes* (fossil).]
FAMILY Cathartidae, New World Vultures.
[FAMILY Teratornithidae, *Teratornis*, *Cathartornis* (fossil).]
SUB-ORDER Falcones, Secretarybirds, Hawks, Falcons.
FAMILY Sagittariidae, Secretarybirds.
FAMILY Accipitridae, Hawks, Old World Vultures, Harriers.
FAMILY Pandionidae, Ospreys.
FAMILY Falconidae, Falcons, Caracaras.

ORDER Galliformes, Megapodes, Curassows, Pheasants, Hoatzins.

SUB-ORDER Galli, Megapodes, Curassows, Grouse, Pheasants.
FAMILY Megapodiidae, Megapodes.
[FAMILY Gallinuloididae, *Gallinuloides* (fossil).]
FAMILY Cracidae, Curassows, Guans, Chachalacas.
FAMILY Tetraonidae, Grouse.
FAMILY Phasianidae, Quails, Pheasants, Peacocks.
FAMILY Numididae, Guineafowl.
FAMILY Meleagrididae, Turkeys.
SUB-ORDER Opisthocomi, Hoatzins.
FAMILY Opisthocomidae, Hoatzins.

ORDER Gruiformes, Cranes, Rails, and Allies.
SUB-ORDER Mesitornithides, Roatelos, Monias.
FAMILY Mesitornithidae, Roatelos, Monias.
SUB-ORDER Turnices, Bustardquails, Hemipodes.
FAMILY Turnicidae, Bustardquails.
FAMILY Pedionomidae, Plainwanderers.
SUB-ORDER Grues, Cranes, Limpkins, Trumpeters, Rails.
[FAMILY Geranoididae, *Geranoides* (fossil).]
[FAMILY Eogruidae, *Eogrus* (fossil).]
FAMILY Gruidae, Cranes.
FAMILY Aramidae, Limpkins.
FAMILY Psophiidae, Trumpeters.
[FAMILY Orthocnemidae, *Orthocnemus*, *Elaphrocnemus* (fossil).]
FAMILY Rallidae, Rails, Coots, Gallinules.
SUB-ORDER Heliornithes, Sungrebes.
FAMILY Heliornithidae, Sungrebes.
SUB-ORDER Rhynocheti, Kagus.
FAMILY Rhynochetidae, Kagus.
SUB-ORDER Eurypygae, Sunbitterns.
FAMILY Eurypygidae, Sunbitterns.
SUB-ORDER Cariamae, Seriemas, and Allies.
[FAMILY Phororhacidae, *Phororhacos*, and Allies (fossil).]
[FAMILY Psilopteridae, *Psilopterus*, and Allies (fossil).]
[FAMILY Brontornithidae, *Brontornis*, *Liornis*, and Allies (fossil).]
[FAMILY Opisthodactylidae, *Opisthodactylus* (fossil).]
[FAMILY Cunampaiidae, *Cunampaia* (fossil).]
[FAMILY Bathornithidae, *Bathornis* (fossil).]
[FAMILY Hermosiornithidae, *Hermosiornis*, *Procariama* (fossil).]
FAMILY Cariamidae, Seriemas.
SUB-ORDER Otides, Bustards.
FAMILY Otididae, Bustards.

[ORDER Diatrymiformes, Diatryma, Omorhamphus, and Allies (fossil).]
[FAMILY Diatrymidae, *Diatryma* (fossil).]
[FAMILY Gastornithidae, *Gastornis*, *Remiornis* (fossil).]

ORDER Charadriiformes, Shore Birds, Gulls, Auks.
SUB-ORDER Charadrii, Shore Birds.
FAMILY Jacanidae, Jacanas.
[FAMILY Rhegminornithidae, *Rhegminornis* (fossil).]
FAMILY Rostratulidae, Painted Snipe.
FAMILY Haematopodidae, Oystercatchers.
FAMILY Charadriidae, Plovers, Turnstones, Surfbirds.
FAMILY Scolopacidae, Snipe, Woodcock, Sandpipers.
FAMILY Recurvirostridae, Avocets, Stilts.
[FAMILY Presbyornithidae, *Presbyornis* (fossil).]
FAMILY Phalaropodidae, Phalaropes.
FAMILY Dromadidae, Crabplovers.
FAMILY Burhinidae, Thick-knees.
FAMILY Glareolidae, Pratincoles, Coursers.
FAMILY Thinocoridae, Seedsnipe.
FAMILY Chionididae, Sheathbills.
SUB-ORDER Lari, Gulls, Terns, Skimmers.
FAMILY Stercorariidae, Skuas, Jaegers.
FAMILY Laridae, Gulls, Terns.
FAMILY Rynchopidae, Skimmers.
SUB-ORDER Alcae, Auks.
FAMILY Alcidae, Auks, Auklets, Murres.

ORDER Columbiformes, Sandgrouse, Pigeons, Doves.
SUB-ORDER Pterocletes, Sandgrouse.
FAMILY Pteroclidae, Sandgrouse.
SUB-ORDER Columbae, Pigeons, Doves.
FAMILY Raphidae, Dodos, Solitaires.
FAMILY Columbidae, Pigeons, Doves.

ORDER Psittaciformes, Lories, Parrots, Macaws, Cockatoos.
FAMILY Psittacidae, Lories, Parrots, Macaws.

ORDER Cuculiformes, Plantain-eaters, Cuckoos.
SUB-ORDER Musophagi, Plantain-eaters.
FAMILY Musophagidae, Plantain-eaters, Touracos.
SUB-ORDER Cuculi, Cuckoos, Roadrunners, Anis.
FAMILY Cuculidae, Cuckoos, Roadrunners, Anis.

ORDER Strigiformes, Owls.
[FAMILY Protostrigidae, *Protostrix* (fossil).]
FAMILY Tytonidae, Barn Owls.
FAMILY Strigidae, Typical Owls.

ORDER Caprimulgiformes, Oilbirds, Goatsuckers.
SUB-ORDER Steatornithes, Oilbirds.
FAMILY Steatornithidae, Oilbirds.
SUB-ORDER Caprimulgi, Frogmouths, Goatsuckers.
FAMILY Podargidae, Frogmouths.
FAMILY Nyctibiidae, Potoos.
FAMILY Aegothelidae, Owlet-frogmouths.
FAMILY Caprimulgidae, Goatsuckers.

ORDER Apodiformes, Swifts, Hummingbirds.
SUB-ORDER Apodi, Swifts.
[FAMILY Aegialornithidae, *Aegialornis* (fossil).]
FAMILY Apodidae, Swifts.
FAMILY Hemiprocnidae, Crested Swifts.
SUB-ORDER Trochili, Hummingbirds.
FAMILY Trochilidae, Hummingbirds.

ORDER Coliiformes, Colies.
FAMILY Coliidae, Colies.

ORDER Trogoniformes, Trogons.
FAMILY Trogonidae, Trogons.

ORDER Coraciiformes, Kingfishers, Bee-eaters, Rollers, Hornbills.
SUB-ORDER Alcedines, Kingfishers, Todies, Motmots.
FAMILY Alcedinidae, Kingfishers.
FAMILY Todidae, Todies.
FAMILY Momotidae, Motmots.
SUB-ORDER Meropes, Bee-eaters.
FAMILY Meropidae, Bee-eaters.
SUB-ORDER Coracii, Rollers, Hoopoes.
FAMILY Coraciidae, Rollers.
FAMILY Brachypteraciidae, Groundrollers.
FAMILY Leptosomatidae, Cuckoo-rollers.
FAMILY Upupidae, Hoopoes.
FAMILY Phoeniculidae, Woodhoopoes.
SUB-ORDER Bucerotes, Hornbills.
FAMILY Bucerotidae, Hornbills.

ORDER Piciformes, Jacamars, Barbets, Toucans, Woodpeckers.
SUB-ORDER Galbulae, Jacamars, Barbets, Toucans.
FAMILY Galbulidae, Jacamars.
FAMILY Bucconidae, Puffbirds.
FAMILY Capitonidae, Barbets.
FAMILY Indicatoridae, Honeyguides.
FAMILY Ramphastidae, Toucans.
SUB-ORDER Pici, Woodpeckers.
FAMILY Picidae, Woodpeckers, Piculets.

ORDER Passeriformes, Perching Birds.
SUB-ORDER Eurylaimi, Broadbills.
FAMILY Eurylaimidae, Broadbills.
SUB-ORDER Tyranni, Ovenbirds, Tyrant Flycatchers, and Allies.
FAMILY Dendrocolaptidae, Woodhewers.
FAMILY Furnariidae, Ovenbirds.
FAMILY Formicariidae, Ant-thrushes.
FAMILY Conopophagidae, Antpipits.
FAMILY Rhinocryptidae, Tapaculos.
FAMILY Cotingidae, Cotingas.
FAMILY Pipridae, Manakins.
FAMILY Tyrannidae, Tyrant Flycatchers.
FAMILY Oxyruncidae, Sharpbills.
FAMILY Phytotomidae, Plantcutters.

FAMILY Pittidae, Pittas.
FAMILY Acanthisittidae, New Zealand Wrens.
FAMILY Philepittidae, Asities, False Sunbirds.
SUB-ORDER Menurae, Lyrebirds.
FAMILY Menuridae, Lyrebirds.
FAMILY Atrichornithidae, Scrubbirds.
SUB-ORDER Passeres, Songbirds.
FAMILY Alaudidae, Larks.
[FAMILY Palaeospizidae, *Palaeospiza* (fossil).]
FAMILY Hirundinidae, Swallows.
FAMILY Dicruridae, Drongos.
FAMILY Oriolidae, Old World Orioles.
FAMILY Corvidae, Crows, Magpies, Jays, Ravens.
FAMILY Cracticidae, Bell Magpies, Australian Butcherbirds.
FAMILY Grallinidae, Magpie-larks, Choughs.
FAMILY Ptilonorhynchidae, Bowerbirds.
FAMILY Paradisaeidae, Birds of Paradise.
FAMILY Paridae, Titmice.
FAMILY Sittidae, Nuthatches.
FAMILY Hypositidae, Coralbilled Nuthatches.
FAMILY Certhiidae, Creepers.
FAMILY Paradoxornithidae, Parrotbills, Suthoras.
FAMILY Chamaeidae, Wrentits.
FAMILY Timaliidae, Babblers.
FAMILY Campephagidae, Cuckoo-shrikes.
FAMILY Pycnonotidae, Bulbuls.
[FAMILY Palaeoscinidae, *Palaeoscinis* (fossil).]
FAMILY Chloropseidae, Leafbirds.
FAMILY Cinclidae, Dippers.
FAMILY Troglodytidae, Wrens.
FAMILY Mimidae, Thrashers, Mockingbirds.
FAMILY Turdidae, Thrushes.
FAMILY Zeledoniidae, Wrenthrushes.
FAMILY Sylviidae, Old World Warblers.
FAMILY Regulidae, Kinglets.
FAMILY Muscicapidae, Old World Flycatchers.
FAMILY Prunellidae, Accentors.
FAMILY Motacillidae, Wagtails, Pipits.
FAMILY Bombycillidae, Waxwings.
FAMILY Ptilogonatidae, Silky Flycatchers.
FAMILY Dulidae, Palmchats.
FAMILY Artamidae, Woodswallows.
FAMILY Vangidae, Vanga Shrikes.
FAMILY Laniidae, Shrikes.
FAMILY Prionopidae, Woodshrikes.
FAMILY Cyclarhidae, Peppershrikes.
FAMILY Vireolaniidae, Shrike-vireos.
FAMILY Callaeidae, Wattled Crows, Huias, Saddle-backs.
FAMILY Sturnidae, Starlings.
FAMILY Meliphagidae, Honey-eaters.
FAMILY Nectariniidae, Sunbirds.
FAMILY Dicaeidae, Flowerpeckers.
FAMILY Zosteropidae, White-eyes.
FAMILY Vireonidae, Vireos.
FAMILY Coerebidae, Honeycreepers.
FAMILY Drepanididae, Hawaiian Honeycreepers.
FAMILY Parulidae, Wood Warblers.
FAMILY Ploceidae, Weaverbirds.
FAMILY Icteridae, Blackbirds, Troupials.
FAMILY Tersinidae, Swallowtanagers.
FAMILY Thraupidae, Tanagers.
FAMILY Catamblyrhynchidae, Plushcapped Finches.
FAMILY Fringillidae, Grosbeaks, Finches, Buntings.

# A CLASSIFICATION OF RECENT BIRDS

Ernst Mayr and Dean Amadon, 1951

ZOOLOGICAL GARDEN
623(Z)
CALCUTTA
& ALIPORE

This classification represents another important and authoritative viewpoint. Ernst Mayr is the Director of the Museum of Comparative Zoology, Harvard, and Dean Amadon is Curator of Birds, American Museum of Natural History, New York. All living or recent Orders are given. Sub-orders have been listed only in the Passeres. For the Song-birds, vernacular groupings are used also, to aid in associating related families. The numbers of recent-known species for each group follow the names in the checklist as a point of general interest; the numbers for sub-families are in brackets. As an example of the rationale behind a classification some notes taken from Mayr and Amadon's *A Classification of Recent Birds*, are appended to certain groups.

ORDER Struthiones
FAMILY Struthionidae, Ostrich, 1

ORDER Apteryges, Moas (fossil) and Kiwis
FAMILY Apterygidae, Kiwis, 3

ORDER Casuarii
FAMILY Casuariidae, Cassowaries, 3
FAMILY Dromaeidae, Emus, 2

ORDER Rheae
FAMILY Rheidae, Rheas, 2

ORDER Crypturi (Tinamiformes)
FAMILY Tinamidae, Tinamous, 33

ORDER Sphenisci
FAMILY Spheniscidae, Penguins, 16

ORDER Tubinares (Procellariiformes)
FAMILY Diomedeidae, Albatrosses, 13
FAMILY Procellariidae, 73
SUB-FAMILY Hydrobatinae, Storm Petrels, (20)
SUB-FAMILY Procellariinae, Shearwaters, etc., (53)
FAMILY Pelecanoididae, Diving Petrels, 4

ORDER Podicipedes (Colymbiformes)
FAMILY Podicipitidae, Grebes, 20

ORDER Gaviae
FAMILY Gaviidae, Loons, 4

ORDER Steganopodes (Pelecaniformes)
STEGANOPODES. *Lanham (1947) has assembled anatomical data to show that the tropic-birds and frigate-birds have a number of apparently primitive characteristics in common with the tubinares. The resemblance between the tropic-birds and the gulls has often been pointed out, but until evidence of true affinity is brought forward, it must be attributed to convergent evolution.*

FAMILY Phaethontidae, Tropic Birds, 3
FAMILY Fregatidae, Frigate Birds, 5
FAMILY Phalacrocoracidae, Cormorants, Anhingas, 31
SUB-FAMILY Phalacrocoracinae, Cormorants, (30)
SUB-FAMILY Anhinginae, Anhingas, (1)

ANHINGIDAE. *Is so much like the cormorant that it would seem to require no more than sub-family status. A few workers do not give it even that.*

FAMILY Sulidae, Boobies, Gannets, 9
FAMILY Pelecanidae, Pelicans, 6

ORDER Falcones or Accipitres
FAMILY Accipitridae, Hawks, Eagles, etc., 205
FAMILY Falconidae, Falcons, etc., 58
FAMILY Pandionidae, Osprey, 1
FAMILY Cathartidae, New World Vultures, 6
FAMILY Sagittariidae, Secretary Bird, 1

ORDER Gressores (Ciconiiformes)
FAMILY Ardeidae, Herons, etc., 59
FAMILY Threskiornithidae, Ibises, etc., 28
FAMILY Ciconiidae, Storks, 17
FAMILY Scopidae, Hammerhead, 1

ORDER Phoenicopteri
FAMILY Phoenicopteridae, Flamingos, 6

ORDER Anseres.
ANSERIFORMES. *Delacour and Mayr (1945) divide the Anatidae into two sub-families and five tribes. Several genera are of doubtful allocation and one in particular, the Magpie Goose (of Australia), deserves to be placed in a sixth tribe.*

FAMILY Anatidae, Swans, Geese, Ducks, 145
FAMILY Anhimidae, Screamers, 3

ORDER Galli
GALLIFORMES. *The gallinaceous birds are one of the primitive and basic Orders. We follow Delacour (1951) in considering the grouse and the guinea-fowl as only sub-families of the Phasianidae.*

FAMILY Megapodiidae, Brush Turkeys, 10
FAMILY Cracidae, Guans, etc., 38
FAMILY Phasianidae, Pheasants, etc., 190
SUB-FAMILY Phasianinae, Pheasants, Quail, etc., (165)
SUB-FAMILY Numidinae, Guineafowl, (7)
SUB-FAMILY Tetraoninae, Grouse, (18)
FAMILY Meleagrididae, Turkeys, 2
FAMILY Opisthocomidae, Hoatzin, 1

ORDER Cuculi
FAMILY Musophagidae, Turacos, 19
FAMILY Cuculidae, Cuckoos, 128

ORDER Grues
FAMILY Cariamidae, Seriamas, 2
FAMILY Psophiidae, Trumpeters, 3
FAMILY Gruidae, Cranes, 14
FAMILY Aramidae, Limpkin, 1
FAMILY Eurypygidae, Sun Bittern, 1
FAMILY Heliornithidae, Sun Grebes, 3
FAMILY Rhynochetidae, Kagu, 1
FAMILY Otididae, Bustards, 23
FAMILY Rallidae, Rails, 132
FAMILY Mesenatidae, Roatelos, 3
FAMILY Turnicidae, Button Quails, 16
SUB-FAMILY Turnicinae, Typical Button Quails, (15)
SUB-FAMILY Pedionominae, Plains Wanderer or Collared Hemipode, (1)

ORDER Laro-Limicolae (Charadriiformes)
FAMILY Jacanidae, Jacanas, 7
FAMILY Thinocoridae, Seed Snipe, 4
FAMILY Chionididae, Sheath Bills, 2
FAMILY Dromadidae, Crab Plover, 1
FAMILY Burhinidae, Thick-knees, 9
FAMILY Haematopodidae, Oystercatchers, 6
FAMILY Charadriidae, Plovers, Sandpipers, etc, 152
SUB-FAMILY Charadriinae, Plovers, (63)
SUB-FAMILY Scolopacinae, Sandpipers, etc., (77)
SUB-FAMILY Phalaropinae, Phalaropes, (3)
SUB-FAMILY Recurvirostrinae, Avocets, Stilts, (7)
SUB-FAMILY Rostratulinae, Painted Snipe, (2)
FAMILY Glareolidae, Pratincoles, Coursers, 16
FAMILY Laridae, Gulls, etc., 89
SUB-FAMILY Stercorariinae, Jaegers, Skuas, (4)
SUB-FAMILY Larinae, Gulls, (43)
SUB-FAMILY Sterninae, Terns, (39)
SUB-FAMILY Rynchopinae, Skimmers, (3)
FAMILY Alcidae, Auks, etc., 22

ORDER Columbae
FAMILY Pteroclidae, Sand Grouse, 16
FAMILY Columbidae, Pigeons, 289
FAMILY Raphidae, Dodos, 3

ORDER Psittaci
PSITTACIFORMES. *The Psittaci are a strongly differentiated group. Any resemblance to the Accipitres is probably mere convergence.*

FAMILY Psittacidae, Parrots, 316

ORDER Striges
STRIGIFORMES. *It is now generally accepted that hawks and owls are not closely related. There is even some evidence to suggest that the hawks may be a polyphyletic group.*

FAMILY Strigidae, Owls, 134
SUB-FAMILY Striginae, Typical Owls, (123)
SUB-FAMILY Tytoninae, Barn Owls, (11)

ORDER Caprimulgi
CAPRIMULGIDAE. *Hudson (1937) found a great difference between the thigh muscles of owls and the Caprimulgidae; but perhaps examination of other families, such as the Aegothelidae (owlet-nightjars), would bridge the gap. There are strong reasons to believe that the two Orders are related but the resemblance of the goatsuckers to swifts is evidently superficial.*

FAMILY Aegothelidae, Owlet Frogmouths, 8
FAMILY Podargidae, Frogmouths, 12
FAMILY Caprimulgidae, Goatsuckers, etc., 67
FAMILY Nyctibiidae, Potoos, 5
FAMILY Steatornithidae, Oil Bird, 1

ORDER Trogones
FAMILY Trogonidae, Trogons, 35

ORDER Coraciae
FAMILY Coraciidae, Rollers, 17
SUB-FAMILY Leptosomatinae, Cuckoo Rollers, (1)
SUB-FAMILY Brachypteraciinae, Ground Rollers, (5)
SUB-FAMILY Coraciinae, Typical Rollers, (11)
FAMILY Alcedinidae, Kingfishers, 87
FAMILY Meropidae, Bee Eaters, 25
FAMILY Momotidae, Motmots, 8
FAMILY Todidae, Todies, 5
FAMILY Upupidae, Hoopoes, 7
SUB-FAMILY Upupinae, Typical Hoopoe, (1)
SUB-FAMILY Phoeniculinae, Tree Hoopoes, (6)
FAMILY Bucerotidae, Hornbills, 45

ORDER Colii
FAMILY Coliidae, Mousebirds, 6

ORDER Macrochires (Apodiformes; Micropodiformes)
MACROCHIRES. *Whether the swifts and hummingbirds are actually related is an open question.*

FAMILY Apodidae, Swifts, 79
SUB-FAMILY Apodinae, Typical Swifts, (76)
SUB-FAMILY Hemiprocninae, Crested Swifts, (3)
FAMILY Trochilidae, Hummingbirds, 319

ORDER Pici
FAMILY Bucconidae, Puffbirds, 32
FAMILY Galbulidae, Jacamars, 14
FAMILY Capitonidae, Barbets, 76
FAMILY Picidae, Woodpeckers, etc., 210
SUB-FAMILY Jynginae, Wrynecks, (2)
SUB-FAMILY Picumninae, Piculets, (29)
SUB-FAMILY Picinae, Woodpeckers, (179)
FAMILY Ramphastidae, Toucans, 37
FAMILY Indicatoridae, Honey Guides, 12

ORDER Passeres
SUB-ORDER Eurylaimi
FAMILY Eurylaimidae, Broadbills, 14
SUB-ORDER Tyranni
SUPER-FAMILY Furnarioidea (Tracheophonae)
FAMILY Rhinocryptidae, Tapaculos, 26
FAMILY Conopophagidae, Ant-pipits, 10
FAMILY Formicariidae, Antbirds and Allies, 221
FAMILY Furnariidae, Ovenbirds and Woodhewers, 259
SUB-FAMILY Furnariinae, Ovenbirds, (212)
SUB-FAMILY Dendrocolaptinae, Woodhewers, (47)
SUPER-FAMILY Tyrannoidea (Haploophonae)
FAMILY Pittidae, Pittas, 23
FAMILY Philepittidae, Philepittas, 4
FAMILY Xenicidae, New Zealand Wrens, 4
FAMILY Tyrannidae, Tyrants, Sharp-bills, 366
SUB-FAMILY Tyranninae, Tyrant Flycatchers, (365)
SUB-FAMILY Oxyruncinae, Sharp-bills, (1)
FAMILY Pipridae, Manakins, 59
FAMILY Cotingidae, Cotingas, 90
FAMILY Phytotomidae, Plant-cutters, 3
SUB-ORDER Menurae
FAMILY Menuridae, Lyrebirds, 2
FAMILY Atrichornithidae, Scrub-birds, 2
SUB-ORDER Oscines, Song Birds
FAMILY Alaudidae, Larks, 75
ALAUDIDAE. *Perhaps best left near the beginnin_ because of the reticulate posterior surface of the tarsus and absence of ossified pessulus in the syrinx.*

FAMILY Hirundinidae, Swallows, 75
HIRUNDINIDAE. *Swallows are specialized, but since they are well differentiated from all other Oscines they may be left near the beginning, pending definite proofs of affinity to other families.*

SUB-FAMILY Hirundininae, Typical Swallows, (74)
SUB-FAMILY Pseudochelidoninae, African River-martin, (1)

BULBULS AND ALLIES
FAMILY Pycnonotidae, Bulbuls, 109
FAMILY Irenidae, Fairy Bluebirds and Leafbirds, 14
FAMILY Campephagidae, Caterpillar Birds or Cuckoo-shrikes, 72
CAMPEPHAGIDAE. Bulbuls and Allies. *Of the vast group of Old World insect-eaters the cuckoo-shrikes are perhaps amongst the most primitive.*

PRIMITIVE INSECT EATERS
FAMILY Muscicapidae, 1460
MUSCICAPIDAE. *The group embraced by the above term has sometimes been called the 'Old World insect-eaters' but it is impossible to separate the New World wrens and thrashers from it. Even the predominantly Old World warblers and babblers have a few New World representatives, and the thrushes are also well represented in the New World.*

*The satisfactory association of many components of this group into families is virtually impossible. This has resulted in some authorities listing Old World flycatchers, warblers, babblers and thrushes as sub-families of the Muscicapidae.*

SUB-FAMILY Muscicapinae, Old World Flycatchers, (378)
TRIBE Muscicapini, Typical Flycatchers
TRIBE Monarchini, Monarchs
TRIBE Rhipidurini, Fantails
TRIBE Pachycephalini, Whistlers
SUB-FAMILY Timaliinae, Babblers, (282)
TIMALIIDAE. *The babblers have long been a 'scrap basket' for genera that did not fit well into the Turdidae or the Sylviinae. Delacour's revision (1946) brought a semblance of order into this group but even so, he was obliged to leave aside a section for 'aberrant genera'.*

TRIBE Pellorneini, Jungle Babblers
TRIBE Pomatorhinini, Scimitar and Wren Babblers
TRIBE Timaliini, Tit-babblers
TRIBE Chamaeini, Wren-tits and Parrotbills
TRIBE Turdoidini, Laughing Thrushes, etc.
TRIBE Picathartini, Picathartes
TRIBE Cinclosomatini, Ground Babblers, etc.
SUB-FAMILY Sylviinae, Warblers, (313)
TRIBE Sylviini, Typical Warblers (includes *Regulus*)
TRIBE Polioptilini, Gnatcatchers, etc.
SUB-FAMILY Malurinae, Australian Warblers, (85)
ACANTHIZIDAE. *In Australia, New Guinea, Polynesia and New Zealand, there is a group of some 85 species of warblers which appears to be quite well differentiated. It includes the birds grouped in the Acanthizidae.*

SUB-FAMILY Turdinae, Thrushes, (304)
TURDINAE *include a number of aberrant genera that probably deserve the status of separate tribes or may even be wrongly placed with this sub-family.*

TRIBE Turdini, Typical Thrushes
TRIBE Zeledoniini, Wren-thrush
TRIBE Myiophoneini, Blue Thrushes
TRIBE Cochoini, Cochoas
TRIBE Enicurini, Fork Tails
SUB-FAMILY Miminae, Mockers and Thrashers, (30)
SUB-FAMILY Troglodytinae, Wrens, (63)
SUB-FAMILY Cinclinae, Dippers, (5)
FAMILY Prunellidae, Hedge Sparrows or Accentors, 12
FAMILY Motacillidae, Wagtails and Pipits, 48
MOTACILLIDAE. *No one believes any longer that the pipits are related to the larks, yet they are left in that vicinity in most classifications. They have a completely nine-primaried wing. Probably the pipits are modified descendants of some group of turdids or sylviids, and they are best placed following this group of families.*

SHRIKES AND ALLIES
SHRIKES AND ALLIES. *This group appears possibly to represent somewhat specialized off-shoots of the Muscicapidae. In the pachycephaline flycatchers of the Australian region, the intermediate steps leading from the Muscicapinae are unmistakable. The shrikes and similar birds may have evolved in the same way but the intermediates are absent or can no longer be determined with confidence.*

FAMILY Laniidae, Shrikes, 67
SUB-FAMILY Laniinae, Typical Shrikes, (25)
SUB-FAMILY Malaconotinae, Bush Shrikes, (42)
FAMILY Prionopidae, Helmet Shrikes, 14
SUB-FAMILY Prionopinae, Helmet Shrikes, (13)
SUB-FAMILY Pityriasidinae, Bornean Bristle-head, (1)
FAMILY Vangidae, Vangas, 11

WAXWINGS AND WOOD SWALLOWS
FAMILY Artamidae, Wood Swallows, 10
FAMILY Bombycillidae, Waxwings, etc., 9
SUB-FAMILY Hypocoliinae, Hypocolius, (1)
SUB-FAMILY Dulinae, Palm Chat, (1)
SUB-FAMILY Ptilogonatinae, Silky Flycatchers, (4)
SUB-FAMILY Bombycillinae, Waxwings, (3)

CREEPERS, NUTHATCHES, AND TITMICE
FAMILY Certhiidae, Typical Creepers, 6
FAMILY Sittidae, Nuthatches, etc., 29
SITTIDAE. *Sitta-Neositta and Daphoneositta (Papuan). These 'tree-runners' resemble in many ways the nuthatches such as Sitta-frontalis. This may be misleading since the open nests of the various species of Neositta are not at all like those of the members of sitta. Perhaps Neositta are related to Climacteris.*

SUB-FAMILY Salpornine, Spotted Creepers, etc., (12)
SUB-FAMILY Sittinae, Nuthatches, etc., (16)
SUB-FAMILY Hypositinae, Coral-billed Nuthatch, (1)
FAMILY Paridae, Titmice, 64
SUB-FAMILY Parinae, Typical Titmice and Chickadees (46)
SUB-FAMILY Remizinae, Penduline Titmice and Verdins, (8)
SUB-FAMILY Aegithalinae, Long-tailed Titmice and Bush Tits, (7)

OLD WORLD NECTAR EATERS

FAMILY Dicaeidae, Flowerpeckers, 54

FAMILY Nectariniidae, Sunbirds, 104

FAMILY Meliphagidae, Honeyeaters, 160

SUB-FAMILY Meliphaginae, Australian Honeyeaters, (159)

MELIPHAGIDAE. *The numerous members of this Australo-Papuan family have, with one or two exceptions, a highly modified suctorial tongue, unlike that of the flowerpeckers or sunbirds, and surely are of independent evolution. Otherwise they are rather unspecialized Oscines, except for the frequent presence of ornamental yellow tufts of feathers or of bare areas or wattles around the eyes.*

SUB-FAMILY Promeropinae, Sugar-bird, (1)

FAMILY Zosteropidae, White-eyes, 80

VIREOS, FINCHES, AND ALLIES

FAMILY Vireonidae, Vireos, 41

FAMILY Drepaniidae, Hawaiian Honeycreepers, 22

FAMILY Thraupidae, Tanagers, etc., 474

SUB-FAMILY Parulinae, Wood Warblers, (109)

SUB-FAMILY Coerebinae, Honeycreepers, (36)

SUB-FAMILY Catamblyrhynchinae, Plush-capped Finch, (1)

SUB-FAMILY Thraupinae, Tanagers, (196)

SUB-FAMILY Pyrrhuloxiinae, Cardinal Grosbeaks, (132)

FAMILY Tersinidae, Swallow-tanager, 1

FAMILY Fringillidae, Typical Finches, 293

SUB-FAMILY Emberizinae, Buntings and American Sparrows, (171)

SUB-FAMILY Fringillinae, Chaffinches, Linnets, and Allies, (122)

FAMILY Icteridae, Troupials, American Blackbirds, and Allies, 88

WEAVERBIRDS, STARLINGS, AND ALLIES

FAMILY Ploceidae, Weaverbirds, 263

SUB-FAMILY Bubalornithinae, Buffalo-weavers, (3)

SUB-FAMILY Passerinae, Sparrow-weavers, (35)

SUB-FAMILY Ploceinae, Typical Weavers, (109)

SUB-FAMILY Estrildinae, Waxbills and Allies, (107)

SUB-FAMILY Viduinae, Widow-birds, (9)

FAMILY Sturnidae, Starlings, 103

SUB-FAMILY Sturninae, Starlings, (101)

SUB-FAMILY Buphaginae, Tick-birds, (2)

FAMILY Oriolidae, Old World Orioles, 34

ORIOLIDAE. *The orioles and drongos parallel in degree of specialization some of the starlings, although they are not necessarily related to them. Indeed it may be that both families are better placed in the vicinity of the Campephagidae and Irenidae, but more evidence is needed.*

FAMILY Dicruridae, Drongos, 20

CROWS AND AUSTRALIAN CROW-LIKE BIRDS

FAMILY Corvidae, Crows, Jays, Magpies, 100

CORVIDAE. *The jays are the most primitive of the Corvidae. From them evolved the first magpies and finally the crows, a genus that contains what are in many ways the most adaptable and highly evolved of all birds. The Australian families associated with crows resemble the Corvidae and equal them in degree of specialization, but may well be of independent evolution.*

FAMILY Cracticidae, Bell Magpies, etc., 11

CRACTICIDAE. *The Australian 'Magpies' resemble shrikes, but we think they are more likely to be related to the Australian corvid-like families.*

CRACTICIDAE. *The bell-magpies or piping-crows of the Australian region resemble the Lariidae and associated families, but in our opinion their real relationship is probably with the Australian and New Zealand corvid-like families. Pycraft thought the Cracticidae to be very near to the bowerbirds and birds of paradise (which are in turn considered to be close to the Corvidae).*

FAMILY Grallinidae, Magpie-larks, etc., 4

GRALLINIDAE. *In this family we unit three genera of Australian mud-nest builders, Grallina, Corcorax and Struthidae. The last two give many indications of relationship despite the difference in the bill (Amadon 1944).*

GRALLINA. *Including the Papuan Pomareopsis, is a very peculiar genus, but the fact that it builds the same bowl-shaped mud-nest as the other two, suggests that it may, after all, be related to them. A preliminary study, including comparison of the skulls of all three genera, has not brought to light any basic differences (Amadon 1950).*

SUB-FAMILY Grallinae, Magpie-larks, (2)

SUB-FAMILY Corcoracinae, White-winged Chough; Gray Jumper, (2)

FAMILY Callaeidae, Wattlebirds, 3

FAMILY Ptilonorhynchidae, Bowerbirds, 17

FAMILY Paradisaeidae, Birds of Paradise, 43

PTILONORHYNCHIDAE: PARADISAEIDAE. *There are some consistent differences between the skulls of bower-birds and birds of paradise, so that the two groups may be placed in separate families. Similarities in behaviour and general morphology, however, indicate that they are not distantly related.*

# SEQUENCE OF PASSERINE FAMILIES

Mayr and Greenway, 1956

In Basel, Switzerland, at the meeting of the *Eleventh Inter-national Ornithological Congress*, one of the proposals put before this gathering was Mayr and Amadon's *Sequence of Passerine Families*. As stated elsewhere in this section on classification, the sequence of Passerines has given rise to more contention than any other group. The higher Passerines in particular—the Oscines, or 'true' singing-birds—are constantly being rearranged by taxonomists. The sequence of Oscines set out below is now considered, in most respects, to be one of the most authoritative and satisfactory to date.

FAMILY Alaudidae
FAMILY Hirundinidae
FAMILY Motacillidae
FAMILY Campephagidae
FAMILY Pycnonotidae
FAMILY Irenidae
FAMILY Laniidae
FAMILY Prionopidae
FAMILY Vangidae
FAMILY Bombycillidae
- Bombycillinae
- Ptilogonatinae
- Dulinae

FAMILY Cinclidae
FAMILY Troglodytidae
FAMILY Mimidae
FAMILY Prunellidae
FAMILY Muscicapidae
- Turdinae (incl. Zeledonia)
- Timaliinae (incl. Chamaea)
- Paradoxornithinae
- Polioptilinae (incl. Rhamphocaenus and Microbates)
- Sylviinae (incl. Regulus, Leptopoecile, Lophobasileus)
- Malurinae
- Muscicapinae
- Monarchinae
- Pachycephalinae

FAMILY Paridae
FAMILY Sittidae
- Sittinae
- Hypositinae
- Neositinae

FAMILY Certhiidae
FAMILY Dicaeidae
FAMILY Nectariniidae
FAMILY Zosteropidae
FAMILY Meliphagidae
FAMILY Emberizidae
- Emberizinae
- Cardinalinae=Richmondeninae
- Tanagrinae=Thraupinae
- Tersininae
- Coerebinae

FAMILY Parulidae
FAMILY Drepaniidae
FAMILY Vireonidae (incl. Vireolanius+Cyclarhis)
FAMILY Icteridae
FAMILY Fringillidae
- Fringillinae
- Carduelinae

FAMILY Estrildidae
FAMILY Ploceidae
FAMILY Sturnidae
FAMILY Oriolidae
FAMILY Dicruridae
FAMILY Callaediae
FAMILY Grallinidae
FAMILY Artamidae
FAMILY Cracticidae
FAMILY Ptilinorhynchidae
FAMILY Paradisaeidae
FAMILY Corvidae

## CHECKLIST OF THE BIRDS OF GREAT BRITAIN AND IRELAND

The British Ornithologists' Union, 1952

Checklists were published by the B.O.U. in 1883, 1915 and 1923. In 1946 the Union Committee decided that a new, revised list was necessary. The result was the 1952 list which is now the basis of most works produced in Britain on birds. It is derived from the broad '1.2.3 version' mentioned in the introduction to this section on classification but with alterations and corrections in the light of more recent research and knowledge. The list below is the table of Orders and families. The list contains only those Orders represented in Great Britain; comparisons with one of the world checklists will show which groups are missing.

ORDER Colymbiformes
FAMILY Colymbidae: Divers

ORDER Podicipediformes
FAMILY Podicipedae: Grebes

ORDER Procellariiformes
FAMILY Diomedeidae: Albatross
FAMILY Procellariidae: Shearwaters, Petrels

ORDER Pelecaniformes
FAMILY Sulidae: Gannets
FAMILY Phalacrocoracidae: Cormorants

ORDER Ardeiformes
FAMILY Ardeidae: Herons, Bitterns
FAMILY Ciconiidae: Storks, Wood Ibis
FAMILY Plataleidae: Spoonbills, Ibis

ORDER Phoenicopteriformes
FAMILY Phoenicopteridae: Flamingos

ORDER Anseriformes
FAMILY Anatidae: Ducks, Geese

ORDER Falconiformes
FAMILY Aegypiidae: Vultures
FAMILY Falconidae: Hawks, Eagles, Falcons

ORDER Galliformes
FAMILY Tetraonidae: Grouse, Ptarmigan
FAMILY Phasianidae: Pheasants, Quails, Partridges

ORDER Ralliformes
FAMILY Balearicidae: Cranes
FAMILY Rallidae: Rails, Gallinules, Coots
FAMILY Otididae: Bustards

ORDER Charadriiformes
FAMILY Haematopodidae: Oystercatchers
FAMILY Charadriidae: Plovers, Lapwings
FAMILY Scolopacidae: Sandpipers
FAMILY Recurvirostridae: Stilts, Avocets
FAMILY Phalaropodidae: Phalaropes
FAMILY Burhinidae: Stone-curlews
FAMILY Glareolidae: Pratincoles
FAMILY Stercorariidae: Skuas
FAMILY Laridae: Gulls, Terns
FAMILY Alcidae: Auks

ORDER Columbiformes
FAMILY Pteroclidae: Sandgrouse
FAMILY Columbidae: Pigeons

ORDER Cuculiformes
FAMILY Cuculidae: Cuckoos

ORDER Strigiformes
FAMILY Strigidae: Owls

ORDER Caprimulgiformes
FAMILY Caprimulgidae: Nightjars and allies

ORDER Apodiformes
FAMILY Apodidae: Swifts, Hummingbirds

ORDER Coraciiformes
FAMILY Alcedinidae: Kingfishers
FAMILY Meropidae: Bee-eaters
FAMILY Coraciidae: Rollers
FAMILY Upupidae: Hoopoes

ORDER Piciformes
FAMILY Picidae: Woodpeckers

ORDER Passeriformes
FAMILY Alaudidae: Larks
FAMILY Hirundinidae: Swallows, Martins
FAMILY Oriolidae: Orioles
FAMILY Corvidae: Crows
FAMILY Paridae: Titmice
FAMILY Sittidae: Nuthatches, allies
FAMILY Certhiidae: Tree Creepers
FAMILY Troglodytidae: Wrens
FAMILY Cinclidae: Dippers
FAMILY Turdidae: Thrushes
FAMILY Sylviidae: Warblers (Old World)
FAMILY Regulidae: Goldcrests
FAMILY Muscicapidae: Flycatchers (Old World)
FAMILY Prunellidae: Accentors
FAMILY Motacillidae: Pipits, Wagtails
FAMILY Bombycillidae: Waxwings
FAMILY Laniidae: Shrikes
FAMILY Sturnidae: Starlings
FAMILY Fringillidae: Finches (New World)
FAMILY Passeridae: Finches (Old World)

# CLASSIFICATIONS OF AUSTRALIAN BIRDS

## Royal Australasian Ornithologists' Union

In 1926 the Royal Australasian Ornithologists' Union revised its checklist and, until recently this, plus amendments, has been the basis of 'official' classification of Australian birds. The R.A.O.U. checklist is now considerably out of date. Many of its family divisions, its sequence of genera, and the relationships between these, are no longer acceptable. A new checklist is under way at the moment, this considerable task being undertaken by H. T. Condon of the South Australian Museum.

Although not representative of modern taxonomic opinion, the R.A.O.U. checklist is given below, as it has been the classification on which most Australian works have been based. The other local checklist shown is Condon's *Handlist of the Birds of South Australia*. Most of the other states have also been dealt with by various ornithologists, as follows: Western Australia (Whittell and Serventy 1948); Victoria (McKean 1959 and Wheeler 1967); Northern Territory (Condon 1948); Tasmania (Sharland 1958); N.S.W. (McGill 1960). Most of the birds of Australia, therefore, are covered, but as the ornithologists responsible for the checklists have slightly differing views on classification we must wait for Condon's revision of the R.A.O.U. checklist of the Birds of Australia, before we have an up-to-date and *standard* work on the subject.

Even then, no doubt, the last word will not have been said on some of our 'problem' birds such as the *Sylviidae*, but at least the classification of Australian birds will be in a more satisfactory state than in the 1926 R.A.O.U. checklist.

CLASS AVES: BIRDS
Sub-class I Dromaeornithes: Ostrich-like Birds
ORDER Casuariiformes: Emus and Cassowaries
FAMILY Dromaiidae: Emus
FAMILY Casuariidae: Cassowaries

Sub-class II Impennes: Penguins
ORDER Sphenisciformes: Penguines
FAMILY Spheniscidae: Penguins

Sub-class III Euornithes: Flying Birds

ORDER Galliformes: Fowl-like Birds
FAMILY Megapodiidae: Mound-builders

ORDER Turniciformes: Bustard-quails
FAMILY Turnicidae: Bustard-quails
FAMILY Pedionomidae: Plain-wanderers

ORDER Columbiformes: Pigeons and Doves
FAMILY Treronidae: Fruit Pigeons
FAMILY Columbidae: Pigeons
FAMILY Turturidae: Doves or Ground-pigeons

ORDER Ralliformes: Rail-like Birds
FAMILY Rallidae: Rails, Crakes and Water-hens

ORDER Podicipiformes: Grebe-like Birds
FAMILY Podicipidae: Grebes

ORDER Procellariiformes (Tubinares): Tube-nosed Swimmers
FAMILY Hydrobatidae: Storm-petrels
FAMILY Pelecanoididae: Diving Petrels
FAMILY Diomedeidae: Albatrosses

ORDER Pelecaniformes: Fishing Birds (Fully-webbed Swimmers)
FAMILY Fregatidae: Frigate-birds
FAMILY Phalacrocoracidae: Cormorants
FAMILY Anhingidae: Darters
FAMILY Sulidae: Gannets, Boobies
FAMILY Pelecanidae: Pelicans
FAMILY Phaethontidae: Tropic-birds

ORDER Lariformes: Gull-like Birds
FAMILY Sternidae: Terns, Sea-swallows
FAMILY Laridae: Gulls
FAMILY Stercorariidae: Skuas

ORDER Charadriiformes: Wading Birds
FAMILY Charadriidae: Plover-like Birds, Dotterels, etc.
FAMILY Scolopacidae: Curlews, Sandpipers, Snipes
FAMILY Jacanidae: Water-pheasants
FAMILY Glareolidae: Pratincoles, Coursers
FAMILY Burhinidae: Stone-curlews
FAMILY Otididae: Bustards

ORDER Megalornithiformes: Crane-like Birds
FAMILY Megalornithidae: Cranes

ORDER Ardeiformes: Heron-like Birds
FAMILY Plegadidae: Ibises
FAMILY Plataleidae: Spoonbills
FAMILY Ciconiidae: Storks

ORDER Anatiformes: Duck-like Birds
FAMILY Anatidae: Swans, Geese, and Ducks

ORDER Accipitriformes: Diurnal Birds of Prey
FAMILY Aquilidae: Eagles, Goshawks, etc.
FAMILY Falconidae: Falcons, Kestrels, etc.
FAMILY Pandionidae: Ospreys, Fish-hawks

ORDER Strigiformes: Nocturnal Birds of Prey, Owls
FAMILY Strigidae: Hawk-owls
FAMILY Tytonidae: Barn-owls

ORDER Psittaciformes: Parrots, Cockatoos, etc.
FAMILY Trichoglossidae: Lorikeets
FAMILY Opopsittidae: Fig-parrots
FAMILY Kakatoeidae: Cockatoos
FAMILY Loriidae: Lorries

ORDER Coraciiformes: Roller-like Birds
FAMILY Podargidae: Frogmouths
FAMILY Coraciidae: Rollers
FAMILY Alcedinidae: Kingfishers
FAMILY Meropidae: Bee-eaters
FAMILY Caprimulgidae: Nightjars
FAMILY Micropodidae: Swifts

ORDER Cuculiformes: Cuckoo-like Birds
FAMILY Cuculidae: Cuckoos

ORDER Menuriformes: Lyrebirds
FAMILY Menuridae: Lyrebirds

ORDER Passeriformes: Perching Birds
FAMILY Pittidae: Ant-thrushes, Pittas
FAMILY Atrichornithidae: Scrub-birds
FAMILY Hirundinidae: Swallows and Martins
FAMILY Muscicapidae: Flycatchers
FAMILY Pachycephalidae: Song-shrikes
FAMILY Grallinidae: Magpie-larks
FAMILY Falcunculidae: Crested Shrikes
FAMILY Campophagidae: Cuckoo-shrikes
FAMILY Sphecotheridae: Figbirds
FAMILY Orthonycidae: Chowchillas, Log-runners
FAMILY Turdidae: Thrushes
FAMILY Epthianuridae: Australian Chats
FAMILY Acanthizidae: Thornbill Warblers
FAMILY Sylviidae: Warblers
FAMILY Artamidae: Wood-swallows
FAMILY Sittidae: Nuthatches
FAMILY Certhiidae: Creepers
FAMILY Dicaeidae: Flower-peckers
FAMILY Pardalotidae: Diamond Birds
FAMILY Nectariniidae: Sunbirds
FAMILY Zosteropidae: Silvereyes
FAMILY Meliphagidae: Honeyeaters
FAMILY Motacillidae: Wagtails and Pipits
FAMILY Alaudidae: Larks
FAMILY Ploceidae: Weaver-finches
FAMILY Oriolidae: Orioles
FAMILY Dicruridae: Drongoes
FAMILY Eulabetidae: Shining Starlings
FAMILY Struthideidae: Apostle-birds
FAMILY Ptilonorhynchidae: Catbirds and Bower-birds
FAMILY Paradiseidae: Rifle-birds, Birds of Paradise
FAMILY Corvidae: Crow, Ravens, etc.
FAMILY Streperidae: Bell-magpies, Crow-shrikes

## HANDLIST OF THE BIRDS OF SOUTH AUSTRALIA

H. T. Condon, 1962
*Curator of Birds, National Museum of South Australia, Adelaide*

ORDER Casuariiformes
FAMILY Dromaiidae, Emus
[FAMILY Dromornithidae (fossil)]

ORDER Sphenisciformes
FAMILY Spheniscidae, Penguins

ORDER Podicipediformes
FAMILY Podicipedidae, Grebes

ORDER Procellariiformes
FAMILY Diomedeidae, Albatrosses
FAMILY Procellariidae, Petrels
FAMILY Hydrobatidae, Storm Petrels
FAMILY Pelecanoididae, Diving Petrels

ORDER Pelecaniformes
FAMILY Phaethontidae, Tropic-birds
FAMILY Pelecanidae, Pelican
FAMILY Sulidae, Gannets
FAMILY Phalacrocoracidae, Cormorants
FAMILY Anhingidae, Darter

ORDER Ciconiiformes
FAMILY Ardeidae, Herons, etc.
FAMILY Threskiornithidae, Ibises

ORDER Anseriformes
FAMILY Anatidae, Swans, Geese, Ducks

ORDER Falconiformes
FAMILY Accipitridae, Hawks, Eagles, etc.
FAMILY Pandionidae, Osprey
FAMILY Falconidae, Falcons

ORDER Galliformes
FAMILY Megapodiidae, Mound-builders
FAMILY Phasianidae, Quails, etc.

ORDER Gruiformes
FAMILY Turnicidae, Bustard, Quails
FAMILY Pedionomidae, Plains Wanderer
FAMILY Gruidae, Cranes
FAMILY Rallidae, Rails, Crakes, etc.
FAMILY Otididae, Bustards

ORDER Charadriiformes
FAMILY Rostratulidae, Painted Snipe
FAMILY Haematopodidae, Oystercatchers
FAMILY Charadriidae, Plovers
FAMILY Scolopacidae, Snipes, Stints, etc.
FAMILY Recurvirostridae, Stilts, etc.
FAMILY Burhinidae, Thick-knees
FAMILY Glareolidae, Pratincoles
FAMILY Stercorariidae, Skuas
FAMILY Laridae, Gulls, Terns

ORDER Columbiformes
FAMILY Columbidae, Pigeons and Doves

ORDER Psittaciformes
FAMILY Psittacidae, Parrots, etc.

ORDER Cuculiformes
FAMILY Cuculidae

ORDER Strigiformes
FAMILY Tytonidae, Barn Owls
FAMILY Strigidae, Typical Owls

ORDER Caprimulgiformes
FAMILY Podargidae, Frogmouths
FAMILY Aegothelidae, Owlet-nightjars
FAMILY Caprimulgidae, Nightjars

ORDER Apodiformes
FAMILY Apodidae, Swifts

ORDER Coraciiformes
FAMILY Alcedinidae, Kingfishers
FAMILY Meropidae, Bee-eaters
FAMILY Coraciidae, Rollers

ORDER Passeriformes
FAMILY Alaudidae, Larks
FAMILY Hirundinidae, Swallows and Martins
FAMILY Motacillidae, Pipits
FAMILY Campephagidae, Cuckoo-shrikes
FAMILY Pycnonotidae, Bulbuls
FAMILY Turdidae, Thrushes
FAMILY Timaliidae, Babblers, etc
FAMILY Sylviidae, Old World Warblers
FAMILY Muscicapidae, Old World Flycatchers
FAMILY Pachycephalidae, Whistlers and allies
FAMILY Neosittidae, Treecreepers and Sittellas
FAMILY Dicaeidae, Flower-peckers
FAMILY Zosteropidae, Silvereyes
FAMILY Meliphagidae, Honeyeaters
FAMILY Fringillidae, Finches, Buntings
FAMILY Estrildidae, Grass-finches
FAMILY Ploceidae, Weaver-finches
FAMILY Sturnidae, Starlings
FAMILY Oriolidae, Orioles
FAMILY Grallinidae, Mudnest-builders
FAMILY Artamidae, Wood-swallows
FAMILY Cracticidae, Butcher-birds, Magpie
FAMILY Ptilnorhynchidae, Bower-birds
FAMILY Corvidae, Crows, Raven

# AUSTRALIAN BIRDS

EMU
♀ 78 in.

# CASUARIIFORMES

## Emu and Cassowary

The emu is the second largest bird in the world, standing about three feet high at the 'shoulder'; a further two feet of neck give the bird considerable stature. It is a rather happy chance that the emu, which is represented on Australia's coat of arms, also heads the classification of our birds, thus giving it a double claim for starting this book.

Australians have not treated their official bird kindly. Once it was extremely common in all suitable habitats, but its history has been a sad one. When white men came to this continent, there were three, and perhaps four, forms of emu; one in Tasmania, another on Kangaroo Island, as well as the mainland bird. The King Island bird may also have been sub-specific. All of these, except the mainland bird, are now extinct.

Sealers on the islands, and settlers in Tasmania wrought havoc amongst these flightless birds. They were hunted for food and their very clear oil, which was used in lamps and medicinally. Emus were also persecuted by pastoralists in self-defence—control no doubt being justifiable, but hardly extermination.

By the early years of this century the slaughter on the mainland was subsidised by the bounties that were paid on scalps and eggs. Actually, in Western Australia, the wheat trampling emu *was* in need of control. In 1932 there was such an influx of these birds into the wheat growing districts that the army was persuaded to provide a machine-gun detachment, at the cost of the local farmers, to do battle with the invaders.

This now infamous 'Emu War' was a fiasco, and less than a thousand birds were shot. The farmers were more successful on their own, killing, for example, 57,000 in six months in 1935.

Emus are still persecuted in parts of Australia, sometimes with a bounty of four shillings being paid on their heads. They are apparently in no danger of extinction, but the overall picture suggests that further control should be undertaken with care.

Australia's second largest bird has fared rather better. The cassowary lives in the dense rain-forest areas of Cape York and so, until lately, has been relatively undisturbed by man. Some of this country is now being opened up, and before it is too late it is to be hoped that large tracts of it will be set aside for the cassowaries and other fauna and flora in our few jungle habitats.

Cassowaries are vigorous birds, able to run through the densest forest at extraordinary speeds: reputedly up to 30 m.p.h. Their coarse hairy plumage is very dense, protecting them in their rushes through the thorny scrub. The high bony casque is also used to thrust aside obstructions as they run. They swim well and commonly do so.

The cassowary is feared by natives and other locals as it is extremely pugnacious. Natives have been mortally wounded, and there is one case of a farmer's son being killed by one. They jump to the attack, striking with their powerful feet which bear long claws. The claw of the inner toe is particularly developed, making it a fearful weapon of offence.

### EMU AND CASSOWARY

The emu *E. Dromaius novae-hollandiae* is distributed throughout the continent, where lack of persecution and suitable habitat permit. They pair off when breeding but otherwise travel in flocks.

A large male weighs up to 120 pounds and may stand 6 feet tall, the females are slightly smaller. They are quite flightless, having only the merest rudimentary wings, but run strongly at speeds up to 30 m.p.h. for short distances. They can also swim well.

If unmolested, emus are inquisitive and even friendly, and they are frequently tamed on outback stations.

Although they eat caterpillars and grasshoppers when available, their diet is mainly herbivorous; consequently they suffer greatly during droughts. The call of the female is a deep, resonant drumming sound and the male utters belly-grunts and low rumblings when disturbed or excited. The sexes can also often be distinguished by the brighter blues on the neck of the male.

Emus usually nest between February and November, depending on the prevailing weather. They commence breeding in their second year and nest in open or lightly covered country. The nest is typically a trampled platform of herbage, in which about 9 dark green eggs are laid. Some nests have been found containing up to 16 eggs, which may indicate polygamy or simply more than one bird laying in the same nest. The hatching, which takes about 60 days, and the early brooding is undertaken entirely by the male.

The eggs weigh about 24 ounces each, and were often eaten by the early settlers.

There are 3 species of cassowary, with about 30 forms, found in New Guinea, the surrounding islands and Northern Australia. The Australian species, *casuaris casuaris*, is confined, on the mainland, to the rain-forests of Cape York.

They are extremely wary birds, and tend to be crepuscular. Leaving the thicker parts of the forest towards evening or in the early morning, the cassowary visits favourite clearings to feed. Their diet consists mainly of native fruits and seeds but a few insects are taken and sometimes small animals and reptiles. The cassowary's call is a harsh repetitive croaking sound; it also has a deep booming grunt somewhat similar to that of an emu.

The sexes are the same colour as each other but the female is unusual in that she is larger than her mate. The rudimentary wings are concealed under its plumage but

CASSOWARY 60 in.

three or four strong bare quills curve down over the bird's thighs, affording protection when pushing through scrub tangles.

Cassowaries nest between July and September in the densest forest. The 3 to 6 dark green eggs are laid on a platform about 3 feet across, which is made up of forest debris. As with the emu, the male bird incubates, and when the eggs hatch both parents raise the young birds.

# PODICIPEDIFORMES

## Grebes

Every major land mass, excepting Antarctica, has its grebes; and in Australia we have three species. The most handsome of these is the Crested Grebe, with its regal chestnut and black collar and bifurcated dusky crest.

They are fairly common in eastern Australia, moving latitudinally with changes of season. In the west they are confined to the south-west corner and are not so common.

Like most grebes they swim with their chicks on their backs and even dive with the young birds securely tucked under their scapular feathers. The plumage is close and velvety and was once in great demand for the trimming of women's hats. Known as Grebe Fur its popularity at one time seriously jeopardised the survival of the Crested Grebe in Europe. Nowadays, of course, the bird is protected by law.

Grebes have the unique and inexplicable habit of eating their own feathers; they also feed them to their chicks. It may be that the feathers are some aid to digestion—perhaps protecting the intestines from sharp fish bones.

The other two species are the Little and the Hoary-headed Grebes. The Hoary-headed has more of a predilection for salt water than the other two species, and is often found in fast scattered flocks on estuaries and other coastal waters.

### GREBES

The Crested Grebe, *Podiceps cristatus*. The Crested Grebe, about 20" long, is the largest of our grebes. It is rather local in the south-western corner of the continent, being found on a few areas of fresh or brackish water from Gingin across to Bremar Bay. In Tasmania and eastern Australia it is considerably more common. It moves northwards in winter and south again in spring, and appears on many suitable stretches of water.

Although it sometimes visits brackish or salt water to feed, the Crested Grebe breeds only on fresh water. It builds a floating nest from weeds and other aquatic vegetation, which is anchored to other nearby growth. Floating as it does, just above the surface, the nest and eggs are quite sodden. When leaving its nest the Crested Grebe, like other grebes, covers its eggs with wet nesting material. By this means they are kept warm with the heat generated by the decomposing vegetable matter. The covering also conceals the eggs from predators, although they are not covered until the clutch is complete.

Having its legs placed so far back, for greater efficiency in swimming, the Crested Grebe is clumsy on land and seldom ventures more than a few yards from water.

Although they can fly, they have difficulty in taking off on their short wings; to escape danger they more usually resort to diving, although they seldom stay under for more than about 30 seconds.

Like other grebes, the Crested has the ability to expel air from its body and its feathers; thus increasing its specific gravity it is able to sink slowly beneath the surface. When suspicious of danger the grebe will often swim with only its head periscoped above water.

They are incredibly agile and rapid on occasion, and

their nuptial displays are a marvel of activity and grace as they skitter across the water with little more than their lobed feet submerged. The male and female indulge equally in these courtship dances, bowing, bill-wrestling and weaving intricate patterns of movement as they run over the surface of the water.

Little Grebe, *Podiceps novae-hollandiae*. This bird, found throughout Australia where suitable habitats exist, usually inhabits fresh water, although it does visit salt water to feed. Large parties gather in the non-breeding season but in the spring they pair off, although even a few acres of water may contain many breeding pairs.

This small 9½″ grebe and the Hoary-headed, are two of the most common water birds throughout their range.

The Little Grebe's nest is a bulky, sodden platform of aquatic vegetation which may measure 2′ across. Throughout the incubation period the birds continue to add material to their nest.

These birds dive frequently and with great alacrity. It is said, in the bush, that they can beat the shot from a gun—diving when they see the flash. They invariably dive to escape danger, and it is almost impossible to induce them to take wing. They do not stay under long when feeding normally, nor swim far underwater, each submersion being about 12 seconds.

Hoary-headed Grebe *Podiceps poliocephalus*. This grebe is about 2″ longer than the preceding species, although this hardly differentiates them in the field. It breeds on fresh water areas, building the usual grebe nest, which, however, is generally smaller than the Little Grebe's. They are found throughout southern Australia from Point Cloates to south-eastern Queensland.

The Hoary-headed tends to gather on coastal waters in winter where great rafts of them can be seen for some weeks each year. They feed for a time over an area and then move on by running across the water. They never become airborne, but their rapidly beating wings slap the surface into a network of silvery wakes. If more seriously disturbed, perhaps by the approach of a boat, they will take off, flying a few inches above the water for a considerable distance.

THICK-BILLED PENGUIN 27 in
ROCKHOPPER PENGUIN 27 in

# SPHENISCIFORMES

## Penguins

Penguins were established in their present form, and over much of their present range, 50 million years ago, and their ancestors lost the power of flight about 100 million years ago. So the penguin is among the most primitive and ancient of birds.

Their loss of flight has been compensated for by their extraordinary swimming powers. Some species' underwater speeds are in excess of 25 mph, and they can shoot themselves up from beneath the surface fast enough to land on a rock or ice-floe five or six feet above the water.

A penguin's body is a perfection of streamlining. Their hard inflexible flippers which move only at the shoulder are ideal for propulsion underwater and their plumage is also highly adapted for an aquatic existence. The feathers grow thickly and uniformly all over their bodies, forming an insulating coat with a shiny waterproof surface.

Although closely associated in people's minds with Antarctica, all but two species occur elsewhere. Some range far up the coasts of South America, South Africa has its penguins, and southern Australia, New Zealand and most sub-antarctic islands also have their colonies.

On land the penguin is ungainly and awkward, although they sometimes travel long distances from the sea to their nesting sites. As adults, they have no enemies on land, although the chicks and eggs are preyed upon by gulls and Giant Petrels. In the sea, the penguins' chief enemies are Killer Whales and the fast and bloodthirsty Leopard Seal, which can outswim the fastest penguin in open water.

Most species are gregarious and they breed in vast colonies, sometimes numbering in the region of half a million in the common species.

### PENGUINS

Little Penguin, *Eudyptula minor*. This is Australia's penguin and a favourite bird with many people. Some Little Penguin rookeries are readily accessible and are frequently visited by the public. The 'penguin parade' starts at dusk, and at one place at least, in Victoria, the beach is floodlit for the benefit of spectators.

The Little Penguin ranges around our southern coasts and islands, from around Fremantle in the west to as far north as Moreton Bay in Queensland. It is also common around Tasmania. It frequents local seas throughout the year and can often be met with singly or in small parties, swimming out at sea. Apparently in western Australian waters it is much less commonly seen in daylight and is more timid of man.

Like other penguins, these nest in colonies, or rookeries, which may number only twenty or thirty nests, but often run up to hundreds. They are sometimes also found nesting singly, but this is not usual. Often a burrow is dug but quite commonly they will lay their one or two eggs under a thick tussock or in a grass-lined hollow scraped under a rock.

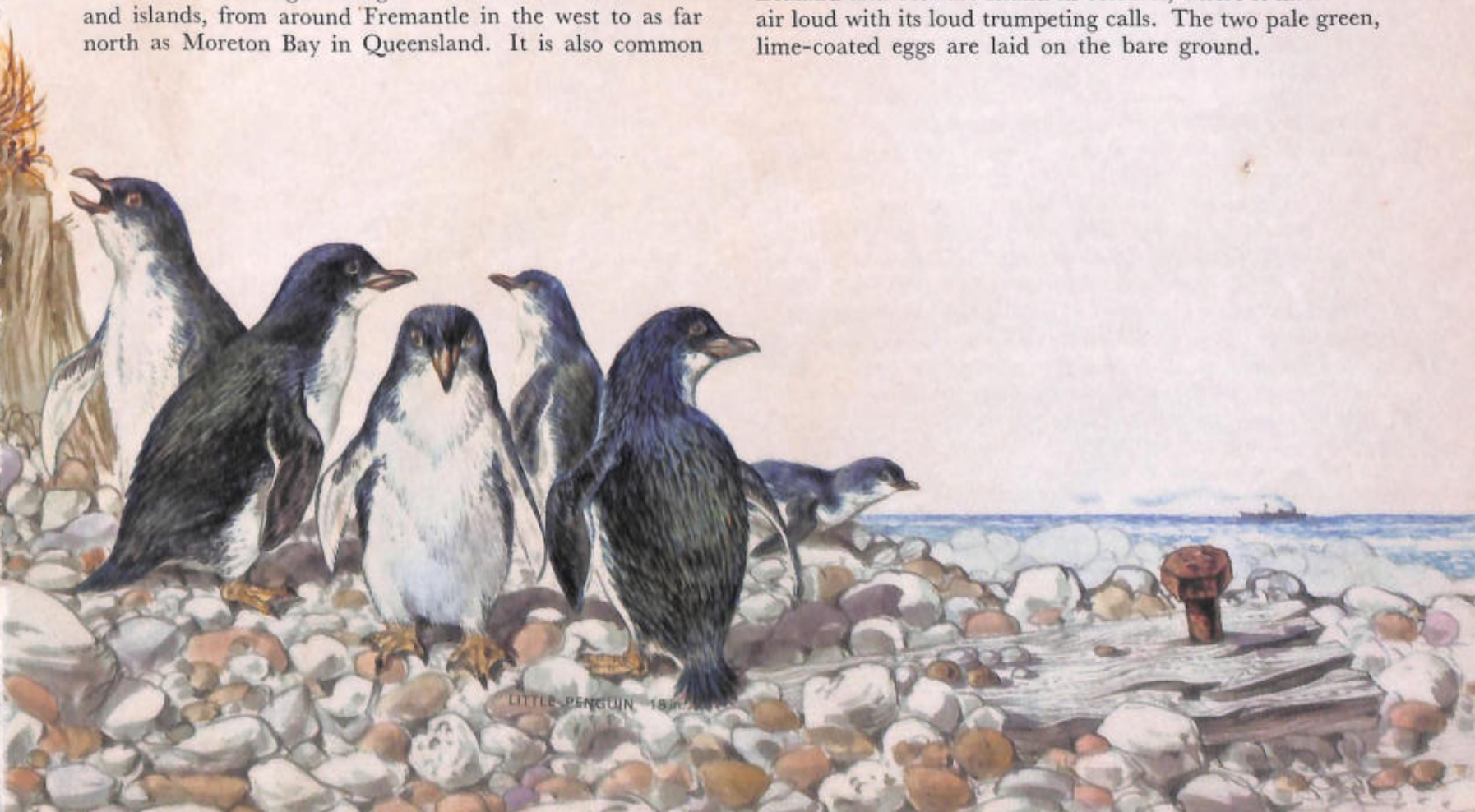
During the day the parent birds are away fishing at sea, but every evening during the nesting season, they return with food for their offspring. The incubation period is 6–7 weeks and the young remain in the nest for about 8 weeks; the nestlings are covered in woolly down, sooty on the back and whitish below.

Little Penguins are very vociferous birds and make the night loud with their short barking cries. They will even yelp crossly if disturbed at sea, although they are curious and will swim around a small boat eyeing the passengers. When swimming on the surface they propel themselves on a rapid, somewhat zig-zag course, showing only the head and a curve of back above the water.

Rockhopper or Crested Penguin, *Eudyptes chrysocome*. There are a number of closely related crested penguins breeding throughout the sub-Antarctic and the Rockhopper is one of these. Occasionally a straggler is recorded on our southern coasts, or seen in local seas. Although more 'crested' than the Thick-billed Penguin, it is very difficult to distinguish this bird from its relatives, especially at sea.

This is the only member of the crested penguin group recorded for Western Australia, and it is unlikely that the Thick-billed would penetrate so far west from its breeding grounds in the New Zealand seas. Like most penguins, it builds no nest, but lays its one or two eggs on the ground.

Thick-billed Penguin, *Eudyptes pachyrhynchus*. The crest of this bird is considerably less developed than in the former species and is inclined to project as an horizontal line behind the eye. There is often a white patch on the sides of the black throat which can also be an aid to identification. The Thick-billed is the commonest of the crested penguins seen in our south-eastern waters. It breeds on the coasts of New Zealand and Stewart Island in colonies, where it makes the air loud with its loud trumpeting calls. The two pale green, lime-coated eggs are laid on the bare ground.



# PROCELLARIIFORMES

The Tube-nosed ocean wanderers

The birds in this order have in common tubular nostrils, which lie along the top or the sides of the bill. They also have in common their pelagic or ocean-wandering habits. Albatrosses, shearwaters, petrels and prions all spend the major part of each year out in the open ocean, coming to land only to breed.

The albatrosses alone build an open nest on the ground, the other families characteristically nest in burrows or concealed hollows under tussocks or rocks. All breed in colonies and lay a single egg which hatches after a long incubation.

Tube-noses have an oil in their stomachs which they regurgitate to feed their young. This oil, which is clear and golden, has a very strong smell and can be sprayed at will if the bird is disturbed. Clothing which has been sprayed will retain the odour for years as many a bird-bander knows.

It is fairly easy to identify the various families, primarily by size, but separating the species is often difficult, especially in the smaller petrels, as they are usually seen at a distance from the deck of a moving ship. Dead petrels are quite often found washed up on ocean beaches, and one of the ways to identify these is by leg and foot colour, which varies from species to species.

Albatrosses, as a group, are easy to spot and most ocean travellers will have seen them soaring behind their liner on motionless wings. These huge sea-birds have been woven into the tales and traditions of the sea ever since men sailed the southern oceans. Coleridge's poem about the Ancient Mariner is the best known and most sophisticated reference to the bird: usually sailors have considered the albatross to be stupid. All their nicknames refer to the bird's lack of wits and such common names as 'Gooney' and 'Mollymawk', derive respectively from English and Dutch words meaning stupid and stupid gull. Certainly their faces have a bland and guileless expression, and the sight of an albatross flopping about on deck, prevented by its long wings from taking off, is a scene of ineffectual struggle.

Their behaviour at the nest is also unlike that of most birds. They will sit tight and allow themselves to be picked up, showing displeasure by stabbing about with their great bill and flailing their wings, but never making any attempt to escape.

In spite of the warning in the *Ancient Mariner*, many albatross were killed for food in the old sailing-ship days, and whole colonies were desecrated. Nowadays they receive strict protection whenever possible and the birds, except for one or two colonies, are in no particular danger.

Their long narrow wings, so effectual for gliding, are inefficient for flapping flight in still air. This explains the fact that albatrosses are confined mainly to the windy southern oceans of the world. The doldrums—windless areas about the equator in the Pacific and Atlantic—are effective barriers which neither the southern nor the few northern species cross in any significant numbers.

The shearwater and petrel families are more widespread and are represented in all the oceans of the world. All are migratory and some, such as our own Short-tailed Shearwater (muttonbird) travel vast distances every year.

It is one group of these tube-noses, the Storm Petrels, that are the 'Mother Carey's Chickens' of sea-lore. This is a name that derives from Mata Cara—the Divine Virgin—who is the protectress of all seamen, and the sudden appearance of these birds is said to presage a storm.

but it is said to become whiter with age. Its beak is similar to that of the Yellow-nosed except that there is another yellow stripe along the lower edge of the bill. It breeds, with other species of albatross, on Kerguelen Island.

White-capped Albatross, *D. cauta*. An albatross which might be considered to be the most Australian of the family, as it breeds on Albatross Is. in Bass Strait, also Pedra Branca and Pyramid Rock. It is rare in western Australian waters but penetrates up the coast of N.S.W. It also breeds on islands of N.Z. It is differentiated from other dark-backed species as its under-wings are white except for black tips.

Sooty Albatross, *Phoebetria fusca*. This is an unmistakable bird, being a fairly uniform sooty brown. It has a white ring almost encircling its eye and also a yellow stripe along the lower mandible. The black bill serves to separate it from the pale-billed Giant Petrel, which it superficially resembles. Its smaller size should distinguish it from an immature Wandering Albatross, also the lack of a white under-wing.

Light-mantled Sooty Albatross, *P. palpebrata*. The back and underparts of this bird are grey, contrasting with its dark brownish head, thus separating it from the preceding species. A more southern bird than the Sooty, it has been collected from Victorian waters but not from further west and there is only one definite sighting from the Great Australian Bight.

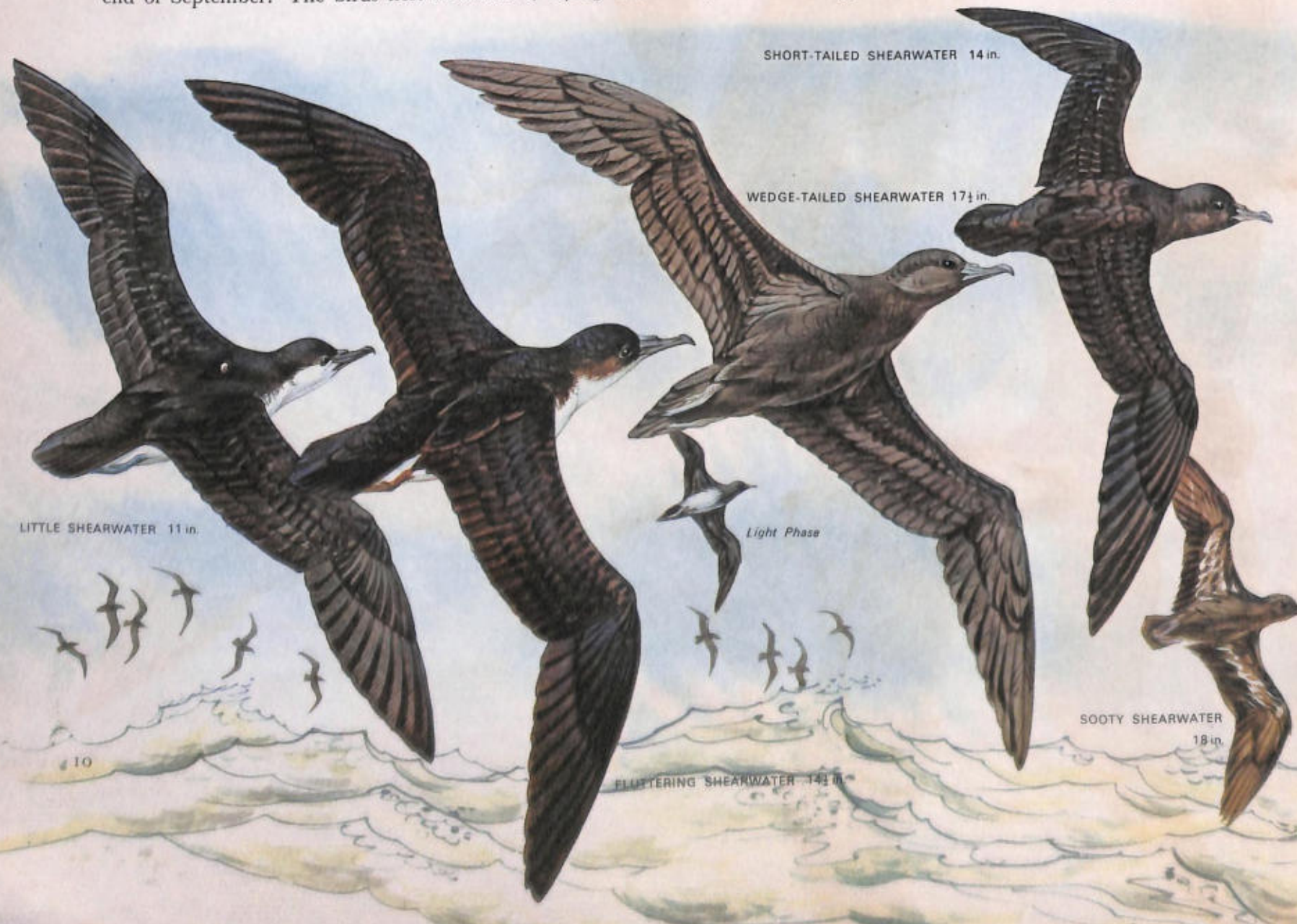
## SHEARWATERS

Short-tailed Shearwater, *Puffinus tenuirostris*. This is the well known mutton-bird which is 'farmed' commercially in Bass Strait. The centre of the industry is the Furneaux Group where thousands of young birds are taken from the burrows each season and sold, either fresh, or salted and packed for transport. Great flocks of shearwaters invade the Bass Strait and other southern Australian islands each year about the end of September. The birds nest in burrows, laying one white egg. Change-over of brooding duties and visits to the chick with food take place only at night. The young bird stays in the nest for 10–12 weeks growing fat and oily and it is these that the 'birders' harvest each year. Those that are left instinctively follow the migration route taken by the adult birds a week or two before. Their annual peregrination takes them in a great loop across the Pacific, up its eastern shores, through the Aleutian Islands and so back south through Japanese waters in time for the breeding season again in south-eastern Australia.

Wedge-tailed Shearwater, *P. pacificus*. This bird, in contrast to *tenuirostris*, appears to be more or less resident in our oceans. Each spring it nests in large rookeries on various islands of our coastline—particularly along the Barrier Reef. Its breeding habits are much the same as the preceding species, and islands where the birds are nesting are loud with their calls throughout the night. Like the other shearwaters, it feeds on krill and small fish such as schools of anchovies.

Sooty Shearwater, *P. griseus*. Found in the seas around our south-east coastline, this species is the commonest 'muttonbird' of New Zealand. It also breeds on Broughton Is., N.S.W., Tasman Is., and probably other Tasmanian islands where it could easily be confused with *tenuirostris*. It is a migratory species, moving up through the Pacific in the non-breeding season.

Flesh-footed Shearwater, *P. carneipes*. Probably the rarest of the shearwaters in our eastern seas, although it breeds on islands of the south west of Western-Australia. Its main nesting grounds locally are on Lord Howe Island and on various islands about New Zealand. It spreads widely in its migrations, travelling into the eastern Indian Ocean; it also reaches Japan and the Californian coast. As with the other shearwaters, it nests in an excavated burrow where it lays one white egg and follows the same nesting procedures,



coming to the nest only at night and eventually leaving the young bird to fend for itself.

Little Shearwater, *P. assimilis*. This tends to be a south-western bird, breeding off our south west coasts, but also on Lord Howe and Norfolk Islands. It is similar in habits to the other shearwaters except that it does not range far from its breeding grounds. It nests in the winter, coming ashore in January on W.A. islands.

Fluttering Shearwater, *P. gavia*. This bird is not uncommon in coastal waters off south-eastern Australia. It will usually be seen in winter but is extremely difficult to distinguish from the Little Shearwater.

It ranges north to Musgrave Island, Queensland, and westwards across the Bight. Australian sightings are probably wanderers from the New Zealand nesting grounds. It has a quick, fluttering flight alternated with gliding and is an expert diver.

## STORM PETRELS

Wilson Storm Petrel, *Oceanites oceanicus*. This bird is a winter visitor from the south and is not uncommonly seen in our seas. It is a migratory species moving north as far as tropical Australian waters, before returning to Antarctica and Kerguelan and Heard Islands, which are its Indian Ocean breeding stations. It is often quite tame and will flutter about fishing boats, with its characteristic 'running on the water', as it looks and forages for scraps. They nest in a chamber hollowed out at the end of a tunnel. The one egg is usually laid on a nest of feathers.

The White-faced Storm Petrel, *Pelagodroma marina* is a common bird in our oceans and the only locally breeding storm petrel. It breeds on the Abrolhos and other islands off the west Australian coast. The nest is not a typical straight petrel-burrow but is usually a twisting narrow tunnel, often with two or three exits. The one egg is either pure white or freckled with reddish spots, and is laid about November.

*Fregetta tropica* is something of a misnomer for the Black-bellied Storm Petrel as it is actually distributed further south than the next species, to which it is related. It is not uncommon in our south-western waters, but has not so far been recorded as washed up on an Australian beach. It nests on sub-Antarctic islands and moves northwards in the winter.

The White-bellied Storm Petrel, *Fregetta grallaria* is often seen in the South Pacific and is now known to visit the South Indian Ocean also, so it is likely to be met with off our southern coasts. It breeds further north than the preceding species on such islands at Lord Howe and in the Tasman Sea.

## PETRELS

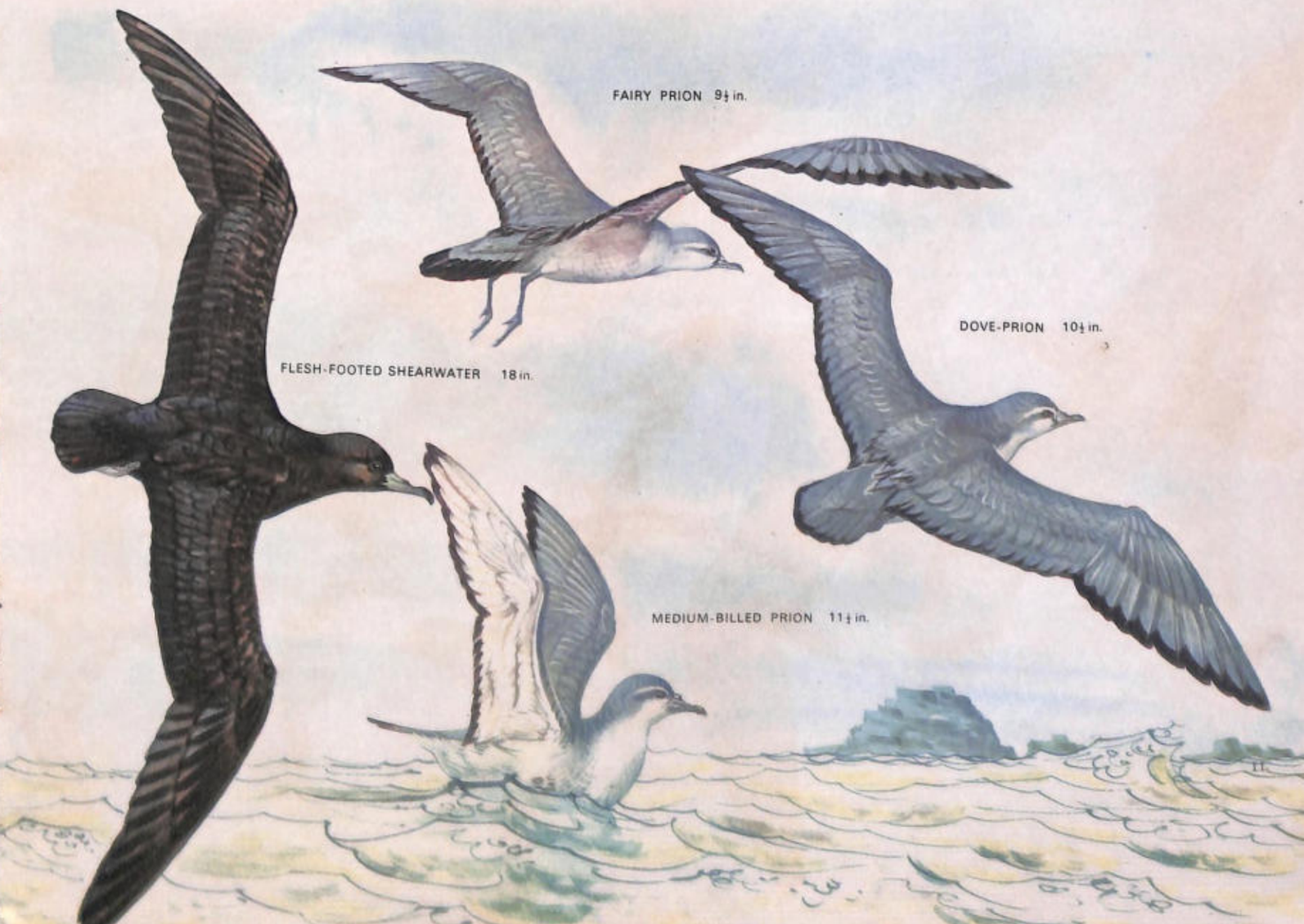
Giant Petrel, *Macronectes giganteus*. This heavily-built bird might be confused with a dark albatross. Its large pale coloured bill, broader wings and less graceful flight should serve to distinguish it.

It is fairly common in southern seas and specimens are often washed up on our beaches. This petrel's range is probably circumpolar, especially in the case of immature birds, before they settle down to breed. It is these dark, young birds that wander to Australian seas; the grey-headed adults remaining in the vicinity of their sub-antarctic nesting islands. There is also a white phase estimated at about 5% of the local population.

Giant Petrels feed on carrion, fish and other marine life procured from the surface of the water. They are also predatory, harrying the penguins and other antarctic birds during the breeding season.

They lay a white egg in a hollow cone-shaped nest, composed of earth and their own droppings.

The Great-winged Petrel, *Pterodroma macroptera* is



another dark-coloured petrel. They are frequently met with in scattered flocks. It is common off S.W. Australia, but less so in south-eastern waters. They are recorded to be blown inland during storms more than any other petrel.

Its local breeding grounds are various islands off the west Australian coast. They nest in winter and the young leave the nest during November. The single white egg is sometimes laid in a short burrow, or, alternatively, under a rock or thick herbage.

I can find no record of them having the predatory habits of the giant petrels, but apart from this, their feeding habits are similar.

Kerguelan Petrels, *P. brevirostris*, are winter visitors from their breeding grounds on St. Paul, Kerguelan and Marion Islands. They are rarely recorded at sea around Australia, most local records being dead birds washed up on the beach.

The Soft-plumaged Petrel, *P. mollis*, is another winter visitor from Kerguelan, St. Paul and Marion Islands. Its habits are stated to be similar to those of the Great-winged Petrel. It is more frequently recorded as washed up on south-western beaches than seen alive in Australian seas.

An underground nester, it lays one white egg and breeds from December to January.

The White-headed Petrel, *P. lessonii* is a rare visitor to our southern seas, although it is slightly more common in the west.

Similar in its habits to the other petrels of its genus, it breeds on Kerguelan, Bounty, Aukland and the Antipodes Islands. It lays a single white egg between December and January in a large-chambered burrow.

White-winged Petrels, *P. leucoptera* have been reported from the seas of N.S.W. and Victoria, but not further west. The only known breeding station of these birds is Cabbage Tree Island off N.S.W. It does not burrow, but lays its chalky white egg in a hollow under a rock. A nest is made of dead cabbage tree fronds.

Cape Petrels, *Daption capensis*, are well known and unmistakable birds with boldly mottled plumage. They are frequently seen following ships, and have been recorded as far north as Geraldton in the west and Percy Island off Queensland in the east.

It is a winter visitor to us, and its breeding range extends down through various sub-Antarctic islands to Antarctica itself. This petrel builds a sketchy nest of earth and stones on a cliff ledge. It lays a white egg and breeds from November to May.

The Blue Petrel, *Halobaena caernlea*, is a dove coloured bird and is easy to confuse with the prions. It may be distinguished by its white-tipped tail.

It is an irregular winter visitor from its breeding haunts on the Falkland and Kerguelan Islands. These petrels are usually recorded as beached specimens as far north as Fremantle in the west and the coasts of N.S.W. in the east.

They build nests of grass, small twigs or other herbage in a large-chambered burrow. This burrow is usually excavated on a plant-covered hillside. One white egg is laid about October.

There are four Diving Petrels, *Pelecanoides*, and they are almost identical. The commonest of the four, *P. urinatrix*, nests in colonies on Bass Strait islands and off New Zealand, as well as on various sub-Antarctic islands.

They swim well under water, using their wings for propulsion and their webbed feet as rudders. Their flight is quite different from the gliding flight of the other tube-noses, being a rapid, whirring wing-beat. They skim along close to the surface and can often be seen plunging through a wave-top, to emerge still flying, in a flurry of wings and water from the other wide.

They lay a single white egg at the end of a crooked burrow and visit their nests only at night. On the nesting grounds the night is loud with their cries, and they are said to croak like frogs and mew like cats.

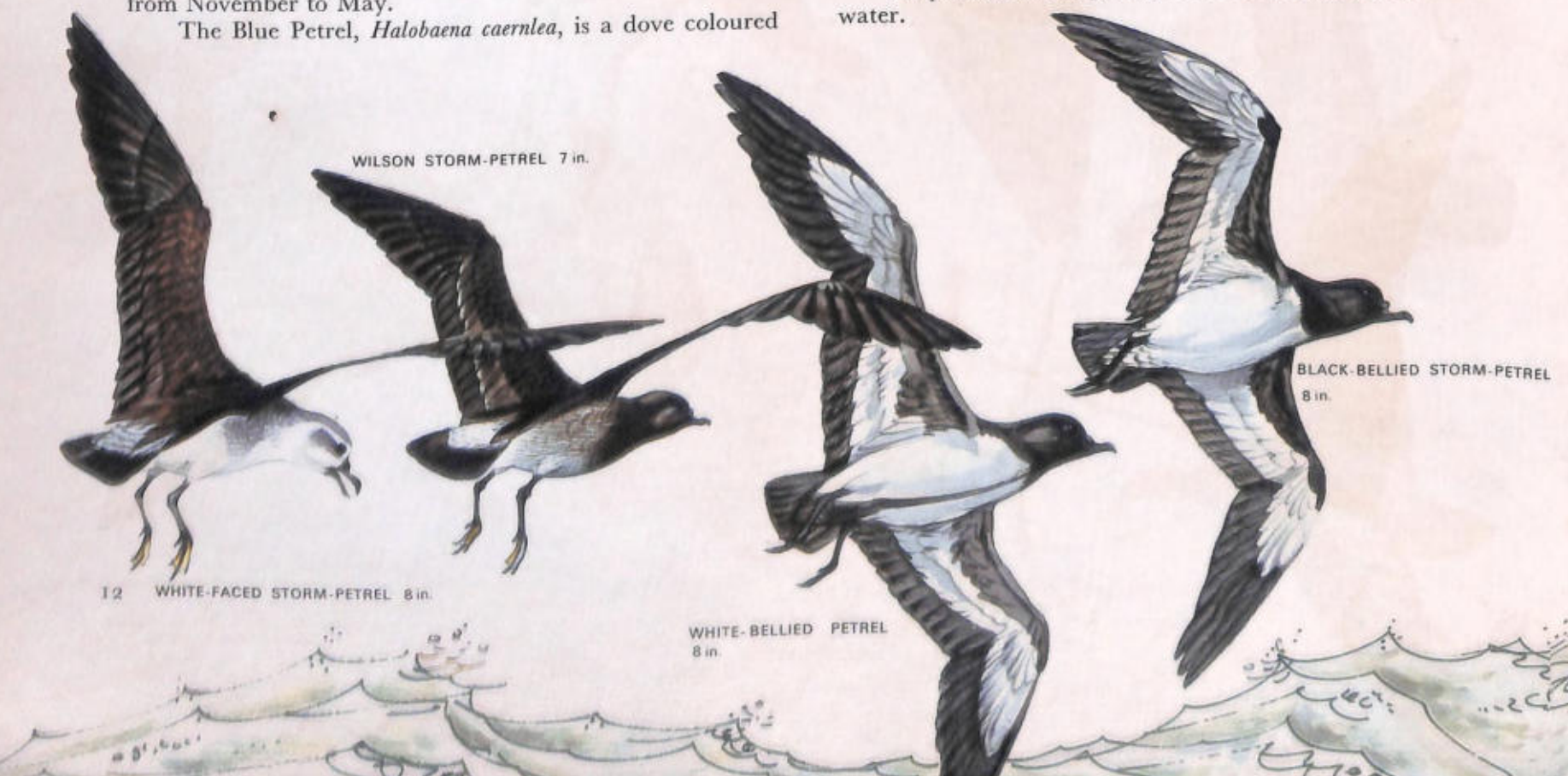
## PRIONS

There are six species of Prions, *Pachyptila*, found on Australian waters, all of which are very similar to each other. The Fairy Prion, *P. turtur*, is the only one that breeds in Australia; the others are winter visitors from the sub-Antarctic. The Fairy Prion nests on islands in the Bass Strait. They make short burrows or nest under thick vegetation, or in the crevices between rocks. They lay one white egg in October.

Their tail-bands are the most helpful distinguishing field mark. In the hand, bill widths and proportions tend to differentiate them.

Westwards, the Dove Prion, *P. desolata*, replaces the Fairy Prion as being the most commonly seen. Medium-billed Prions, *P. salvini*, breed on various sub-Antarctic islands and migrate northwards in the winter. It would be difficult to separate this prion from the others at sea, but after winter storms they are sometimes washed up on southern beaches from Western Australia to New South Wales.

All prions dive frequently for food and swim well under water.



GREAT-WINGED PETREL 15 in.
WHITE-HEADED PETREL 16½ in.
GIANT PETREL 33 in.
KERGUELAN PETREL 13 in.
CAPE PETREL 15½ in.
BLUE PETREL 11 in.
SOFT-PLUMAGED PETREL 15¼ in.
WHITE-WINGED PETREL 13 in.

PELICAN 60 in.
LITTLE BLACK CORMORANT
24½ in.
BLACK CORMORANT 32 in.
LITTLE PIED CORMORANT 23 in.

# PELICANIFORMES

## Pelicans and Allied Birds

The birds in this disparate order, which contains such apparently unrelated species as pelicans and gannets, are linked by various anatomical features. They have in common (and it is peculiar to this group) webbing between all four toes. The hind toe is turned well inwards and is linked by a web to the inner toe. All have a more or less distensible gular or throat pouch, with its greatest development in the pelican. The young are born blind and usually naked, and are fed by both parents on regurgitated food.

The Pelecaniformes are a very ancient group and have some of the oldest fossil remains of any living order. There is *Elopteryx*, a cormorant-like bird from the Cretaceous, about 100 million years old, and there are also fossils extant of several still living genera from Oligocene deposits, laid down 40 million years ago.

These birds are always closely associated with water and their distribution is world-wide throughout tropic and temperate zones.

In Australia all six genera are represented. The Pelican, the 'type-bird' as it were, is one of the most grand and stately birds to be seen in this country. It is a strong flier and is found throughout the continent where conditions permit, on fresh and salt-water alike.

The cormorants are also represented all around the continent by various species. Some breed in large numbers on inland fresh water, and others more typically in sea-shore colonies. They are great fish-eaters and unpopular with fishermen, especially those birds frequenting fresh water. They are often shot, but in a disorganized fashion and there is even one case of a colony being dynamited; but as a group they appear to be in no danger of extermination.

Similar to the cormorants in many ways is the Darter. It has a long, sinuous, almost snake-like neck and frequently swims with its body submerged except for its long-billed head and neck; a habit which must contribute to its popular name of snake-bird.

Our local Gannet and boobies, or brown gannets, make up four species. The Australian Gannet, closely allied to the North Atlantic bird, is confined to the regions of Bass Strait and Tasmania locally, although it also breeds on some New Zealand islands.

This bird has only a few Australian breeding colonies, one of these—on Cat Island, Bass Strait, has been decimated by fishermen and other marauders to such an extent, that in 1966 there were probably less than a dozen nests occupied, where once hundreds of birds bred.

The other three local gannets are tropical and sub-tropical and in the main inhabit very lightly populated areas and so are seldom molested.

There are three species of tropic-bird in the world, two of which are on the Australian list. They seldom stray out of tropical waters and are the most pelagic of the Pelecaniforme order.

Our two frigate-birds are also tropical, although they occasionally wander into our southern seas. They are piratical in the extreme, spending most of the day on the wing chasing other species and forcing them to jettison their food, which the frigate bird then catches on the wing.

### PELICANS

The Australian Pelican, *Pelecanus conspicillatus*, is one of our largest flying birds: it can weigh nearly twice as much as a Wedgetailed Eagle—up to 17 lbs.—and its wingspan is as much or more than the 6–7 ft. average for this eagle.

The Brolga and Jabiru would be the closest in average sizes.

Pelicans live on fish, and use their large gular pouch, which can hold up to three gallons of water, as a 'dipper' for catching their prey. The fish are not stored in the pouch, the water is strained out and the fish are then swallowed or carried crosswise in the bill.

These birds are of very ancient lineage and fossil remains have been found that are 30 to 40 million years old. These fossil pelicans are so similar to the present birds as to be placed in the same genus.

Although powerful flyers and good swimmers, pelicans are clumsy and slow on land, as they have their feet placed so far back for swimming efficiency. They have trouble taking off also, and on a windless day have to run flapping a considerable distance over land or water before becoming air-borne.

They nest in colonies and tend to be sociable even out of the breeding season. The colony may be close to either fresh or salt-water. The birds lay two or three lime-coated eggs. In eastern Australia and Tasmania they start nesting in October but in the west egg laying commences in the autumn. The nests are usually a mere hollow scraped in the ground, with each bird sitting just out of pecking distance of its neighbour.

## CORMORANTS

The Black Cormorant, *Phalacrocorax carbo*, is the largest of this group. It is quite a common bird and is found on both fresh and salt-water. It breeds close to water in colonies, which are sometimes very large mixed gatherings of various cormorant species. This is the only cormorant which is sometimes a significant predator on 'commercial' fish, but only in fresh water habitats.

The nest is bulky and made up of whatever materials are to hand. The three or four eggs are greenish when new but soon become coated with lime. Black Cormorants, like others of the genus, swim well and usually pursue their prey under water.

In Western Australia it appears to be more common on inland waterways, whereas in Tasmania it is recorded as being more a frequenter of estuaries and sheltered bays. In any case, like all cormorants, it is seldom found far from the land.

They are often seen sitting with their wings held open to dry in the sun and wind. This is because they do not have the waterproof plumage usually associated with aquatic birds. Indeed, they can become so saturated that flight becomes difficult or impossible until they have dried out.

The Little Black Cormorant, *P. sulcirostris*, appears to be more an estuarine or fresh water bird, and is seldom found on open coasts. They hunt in large flocks, but, contrary to the belief of many fishermen, their prey is usually 'non-commercial' fish such as anchovies, smelt and other small rough fish. This cormorant is found throughout the continent but has been recorded only as a non-breeding visitor to Tasmania. It nests in colonies, often in association with its Little Pied and Black relatives. The nest and eggs are similar to those of other cormorants, and breeding is from August to December or later.

Yellow-faced Cormorants, *P. varius*, are frequenters of the coastline although they do extend inland in a few suitable localities. They nest in large colonies, and on western Australian coasts, produce guano in such quantities that until about 1888 it was exploited commercially. They are voracious feeders and such species as parrot-fish, cobblers, leather-jackets and pipe-fish have been found in the stomachs of cormorants from a sea-side colony.

Pied Cormorants build bulky nests on rocks or in bushes or mangroves, composed of sticks, seaweed and other aquatic herbage; the nest is often lined with fresh leaves. There appear to be no confirmed records of this bird in Tasmania, although it is possible that they make occasional visits.

Little Pied Cormorants, *P. melanoleucus*, are probably the most common of the genus in the east, although in Western Australia the Pied would appear to be more numerous. It is rare along the wild, steep coastlines of the Bight, as are all cormorants.

There is some variation in the plumage of this bird, some specimens having partly or wholly grey underparts. The nesting and other habits are similar to those of other cormorants.

The Black-faced Cormorant, *P. fuscescens*, is, in the main, a coastal bird although it is found inland in some areas. It is uncommon in Tasmania and Bass Strait and is not recorded as penetrating up the east coast of the continent.

Like its relatives, it breeds in colonies, sometimes in large numbers. The nests are bulky and constructed of local aquatic material. They usually lay fewer eggs than the other cormorants, two being a common clutch. Under their limey coating the eggs are pale greenish blue.

AUSTRALIAN GANNET 32 in.

RED-FOOTED GANNET 29½ in.

MASKED GANNET 33 in.

BROWN GANNET 28 in.

## DARTERS

The Darter, *Anhinga novae-hollandiae*, is a somewhat cormorant-like bird, but is the least marine of the Pelecaniformes, although it is sometimes seen in brackish water or estuaries. Like the cormorants their feathers are not particularly waterproof and have to be dried out periodically.

Darters are strong underwater swimmers, where they pursue most of their prey. They propel themselves by means of their powerful webbed feet; the wings are not used but folded close to the body. The bird hunts with its long neck coiled back in a tight 'S', and when the prey is within range this 'coiled spring' is unleashed with great rapidity, to impale the target on its long rapier-like bill. It feeds on yabbies, frogs and other small water animals as well as fish.

GREATER FRIGATE-BIRD 40in.

Like the cormorants, they are able to increase their specific gravity—by forcing air out of their bodies and from beneath their plumage—and thus sink slowly beneath the surface. They often swim submerged except for their long necks, which look quite snake-like slipping through the water.

The Darter is a strong flier, progressing by alternately flapping and gliding. They nest in small colonies, in trees growing in or over water, and often in company with other birds. The nest is a flattish platform of sticks lined with fresh herbage. The three or four eggs are similar to those of the cormorant but considerably more pointed at one end. Darters nest at various times in different localities, depending on prevailing conditions. It is not recorded as a Tasmanian bird, but is found in suitable habitats throughout the rest of Australia.

## GANNETS

The Ganfiet, *Sula serrator*, is a fairly common bird within its Australian breeding range becoming less common westwards and northwards. Five local breeding colonies are: Laurence Rocks, Black Pyramid and Cat Island in Bass Strait, and Pedra Branca and Eddystone Rocks off Southern Tasmania. It also breeds in New Zealand and in the winter it migrates to our warmer south-eastern waters. Gannets are handsome and striking birds and may be often seen fishing in parties. They hunt by flying above the water until a school of fish is spotted. The birds then plummet down, from as high as 100 ft. or so, and dive more or less vertically beneath the surface. Usually they stay under water only a few seconds, although gannets have been found trapped in fishermen's nets as much as 90 ft. down. If a fish is caught it is swallowed underwater. They start

nesting in the early spring, laying their eggs in solidly built nests, which are cones of earth and guano, lined with weed, twigs and other material. The one or two eggs are bluish-white but coated with lime.

Masked Gannet, *S. dactylatra*, is tropical and sub-tropical and rarely appears in our southern waters. It breeds on islands off our north-west and north-eastern coasts. With the Brown Gannets and the Red and Blue-footed Gannets these birds are known as boobies, presumably because of their lack of fear of man.

It nests in colonies, laying its two typical gannet eggs in a depression in the sand. Herbage is placed around the edges of the nest and added to as incubation proceeds. In the north-west some individuals are recorded as breeding in spring and some in autumn. In the north-east they start about July.

The Red-footed Gannet, *S. sula*, is another white booby which may be distinguished by its feet and its habit of nesting in trees which is unusual amongst gannets. There is a colony of these birds on Raine Is., Queensland, where they commence nesting about May. Their feeding techniques and life histories are similar to those of the other gannets.

Brown Gannets, *S. leucogaster*, are some of the commonest birds throughout tropical Australian seas. They are also found generally throughout the tropics.

These brown boobies do not range further south than the Dampier Archipelago in the west and central N.S.W. in the east. They breed in extensive colonies on the Barrier Reef and on some north-west Australian islands. The nest may be anything from a weed-decorated scrape, to a solid pile of herbage and earth a few inches high. They lay two typical gannet eggs about July, but the birds usually only manage to rear one of the young.

Boobies are fond of flying fish and may be seen scouting ahead of ships at sea, waiting for these fish to be 'flushed from cover'. The booby then dives diagonally, following its prey under the waves, where it is usually successful in catching it.

## FRIGATE-BIRDS

The two Frigate-birds, *Fregata*, are birds of our tropical and sub-tropical seas, although they occasionally wander south; the Greater Frigate-bird *F. minor*, particularly, has been recorded around southern Australia.

*F. minor* does not breed off the west Australian coast and is only an infrequent winter visitor to those parts. The Lesser Frigate-bird, *F. ariel*, does, however, breed in the west, and both birds nest off N.E. Australian coasts.

They are very swift and graceful fliers and spend most of their time on the wing. Frigate-birds are well known for their piratical tactics. They harry other species until the unfortunate victim is forced to give up its food to the attacker. Otherwise their livelihood is flying-fish snapped out of mid-air, or anything else small that swims or floats on the surface of the sea. They also prey on the young of other sea-birds.

They have webbed feet but seldom enter the water except by accident, and should they do so their feathers soon become waterlogged. These birds are clumsy on land and so usually perch on a branch or some other prominence, where there is room to spread their long, almost swift-like wings.

In both species during the courting season, the male's orange gular pouch becomes bright crimson and is distendable. He inflates it to great effect as he sits on the nest. This is usually built on a bush or on an exposed rock. The male works on the nest and protects it from neighbours, while the female supplies him with sticks.

Breeding starts about March or April each year according to locality, but the peak breeding season varies considerably from year to year. Normally only one egg is laid and the young is naked when hatched, but soon grows its whitish down.

## TROPIC-BIRDS

The Red-tailed Tropic-bird, *Phoethon rubricauda*, is a bird of the tropical Indian and Pacific Oceans. It is common about, and breeds on, Norfolk, Lord Howe and Raine Islands in the east but in the west only a few isolated pairs have nested over the years in the Abrolhos area. It is noted as an occasional straggler as far south as Tasmania.

They appear to be quite indifferent to the proximity of human activity whilst nesting, and one bird on record in Western Australia laid its egg on a track used by motor trucks. Another bird nested alongside the same track. They will sit tight and allow themselves to be lifted from their egg.

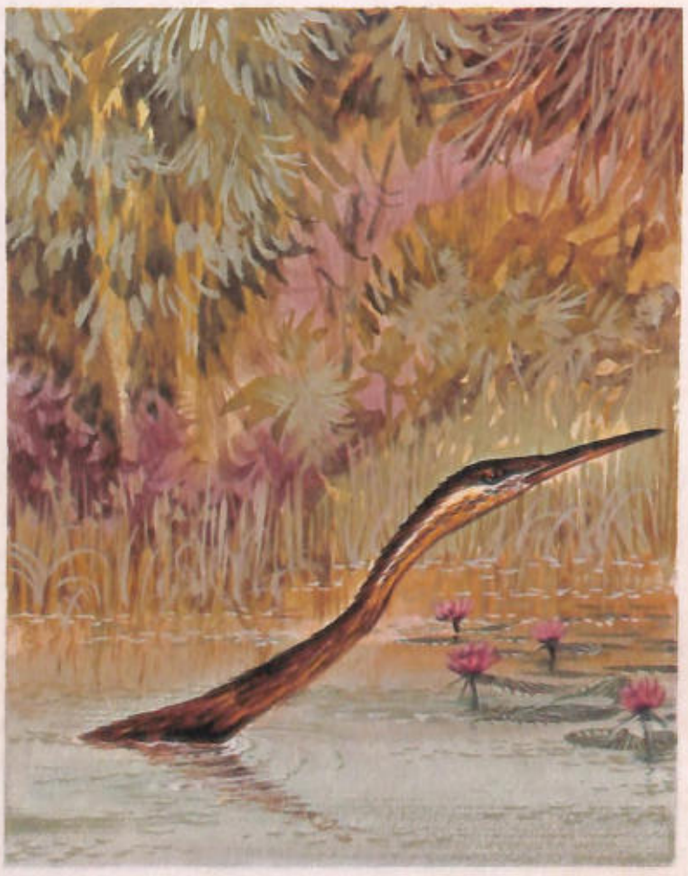
Tropic-birds are great ocean wanderers and often roam far out to sea, where few other birds are seen. They seldom rest on the water, being poor swimmers but, unlike the frigate-birds, float buoyantly if they do alight.

Their breeding cycle is an extended one, being about three months, with a month of incubation and two months before the chick is fledged. The young are deserted at the end, and driven by hunger, set out on their wanderings alone. No nest is made, the one red-speckled, white or pinkish egg being laid in a depression on a rock or on the ground.

On Lord Howe Island they nest from September to March; elsewhere they nest at any time local conditions are suitable.

White-tailed Tropic-bird, *P. lepturus*, is a rare straggler to our north-eastern islands and coasts between the Gulf of Carpentaria and N.S.W. It is similar in habits to the Red-tailed bird and is equally bold on its nesting grounds.

*Darter Swimming*



# CICONIIFORMES

## Herons and Allied Birds

In Australiia this order is represented by six genera of fairly similar looking birds. They do vary considerably in size, however, ranging from the Great-billed Heron which stands about three feet high, down to the mere fifteen inches or so of the Pied Heron.

All of the 'true' or pond herons, are long-necked long-legged birds which spend most of their time in or near water or swampy land. Their principal food is fish and small aquatic animals such as frogs, yabbies and eels.

The neck of the heron is made up of unequal vertebrae, causing that typical kink. This is probably helpful as a form of leverage—enabling the bird to dart its head forward with great rapidity at moving prey.

Linked with the herons in the family *Ardeidae* are the Bitterns. These birds tend to be stockier and shorter necked than the herons and are usually more complexly patterned in mottled browns and buffs.

Both herons and bitterns have a marked development of powder-down patches. These are found in paired areas, on the breast, rump or flanks. The powder-down is never moulted and is made up of feathers which crumble into a powder, used by the birds in cleaning their plumage.

The oil and slime adhering to the feathers after a bittern or heron has struggled with an eel or other slimy creature, is absorbed by the powder. It is applied in some cases by means of the bill, or the bird rubs its head through the powder patch. After the powder has done its job of absorption, it is vigorously scratched and combed out, mainly by means of the serrated 'comb-claw' on the middle toe. Once cleaned and combed, oil, to waterproof the plumage, is rubbed in from the bird's preen gland.

The night heron is classified as separate from the 'typical herons' and is indeed more active at night, doing most of its feeding during darkness. They also differ from the true herons in that they breed in colonies, are more bittern-like in plumage and have a soft almost owl-like flight.

The genus *Buturides* is represented in Australia by the mangrove herons. These are also bittern-like birds, having two varieties, which are considered by some ornithologists to be simply colour phases of the one species.

The bitterns of Australia are the Brown, the Black and the Little. This last species is the only one of theCiconiiformes in which there is sexual dimorphism, although the differences are not great.

The other two are typical bitterns, with such habits as depending on their camouflage for protection, rather than flight. If alarmed, they stretch themselves upwards in an elongated vertical pose and their striped and mottled plumage blends remarkably well with a reedy background. As one walks past them they turn slowly so as to present the narrowest aspect—their fronts—to the observer. Their heads are so shaped and their eyes are placed, so that even with the head thrown back the bird can still look forward on either side of its bill.

They have booming cries which tend to be somewhat ventriloquial and difficult to pinpoint.

In the genus *Egretta* are the four white egrets and the reef heron, which has a white and a grey phase. The egrets are the unfortunate birds that grow the plumes or 'aigrettes' that were so popular as women's adornments around the turn of the century. In many parts of the world these birds were in danger of extermination, but fortunately protection is now becoming universal. There are however, still a few places in the world where egrets continue to be hunted to supply a black market in plumes.

Perhaps the main threat to the existence of these birds today, is the draining of swamps for land reclamation.

They breed in colonies, sometimes in great numbers, on inland swamps and often in company with other members of the order.

We have one stork in this country, the Jabiru, a stately bird and one of Australia's largest flying birds. They lack the serrated comb-claw and powder down of the other ciconiiforms. The Jabiru is a powerful flier, often soaring up out of sight to the human observer.

The Ibis and the Spoonbills are grouped together in the family *Threskiornidae*. Of the three ibis the white and the straw-necked are the most common, the dark hued glossy ibis being generally restricted to northern parts.

Ibis often appear in large numbers, in various localities, and usually the influx is associated with a sudden increase in some insect such as grasshoppers, upon which the ibis feed.

Unlike the herons, ibis and spoonbills fly with their necks extended, and while the ibis flap and glide alternately, the spoonbill usually has a continuous steady wing-beat.

Both the ibis and the spoonbills are colony nesters—frequently with different species mixed together. It is interesting that the young birds are able to swim to a certain extent. When, as they frequently do, they topple out of their flimsy nests into the water below, they usually manage to swim to the nearest branches and clamber out.

### HERONS

The giant of the heron family is the Great-billed Heron, *Ardea sumatrana*. It is found in coastal districts across northern Australia and down the Queensland coast to the vicinity of Broad Sound.

It is a shy and wary bird, and its typical haunts are the channels of open water between dense stands of mangrove trees. It feeds on the various aquatic creatures found in swamps and, when disturbed, immediately flaps heavily off, giving a harsh croak as it leaves.

It builds a flattened and bulky nest of sticks usually in a mangrove overhanging an open channel. The two pale blue-green eggs are laid at various times, depending on the prevailing local conditions.

The White-necked Heron, *Ardea pacifica*, has recently been put into the same genus. It is found all over the continent and Tasmania in suitable habitats. It is not a particularly common bird, although local influxes are reported from time to time.

This heron breeds in colonies and the nest is a bulky platform of sticks usually built in a tall dead tree. The eggs, normally four, are pale greenish-blue and are laid about September or October.

The White-faced Heron, *A. novae-hollandiae*, is the common heron in most parts of Australia and Tasmania. Erroneously known as the 'blue-crane' by many people, it can be seen on waterways and swampy areas even in, and close to, cities. Flocks of twenty or thirty birds are quite common although solitary birds are also often seen standing sentinel over a pond or swamp. It also frequents sea beaches, hunting along the tide-line and shallows for food.

They nest as a rule in tall trees, not necessarily near water, and sometimes a small number of birds will build in the same vicinity, although hardly forming a tight colony. The two to six pale blue eggs are laid in September or October on a simple, loosely-built platform of sticks.

Pied Herons, *A. pictata*, are delicate black and white birds found in northern Australia from the Wyndham district to north-eastern Queensland. They are not particularly shy

WHITE IBIS 30 in.
GLOSSY IBIS 25 in.
STRAW-NECKED IBIS 28 in.
LARGE EGRET 30 in.
CATTLE EGRET 21 in.

and may be seen singly or in scattered numbers feeding on swampy land or wading in the shallows of a lagoon or stream.

This heron is thought to be a migrant, arriving here from the north to breed in the Autumn.

The breeding season is from March to May and a concave platform of sticks is built, usually in a mangrove, about fifteen feet up. The three or four eggs are deep blue-green.

The Nankeen Night-Heron, *Nycticorax caledonicus*, is a bittern-like bird found in suitable localities throughout the continent and Tasmania.

They are in the main nocturnal, fishing in the shallows of swamps, lakes and streams for yabbies and other aquatic life. Sometimes they can be seen wading into deep water up to their 'shoulders'. If disturbed, they will fly off on broad slow wings, with a grating croak of alarm.

Nankeen Herons are well known for their visits to city parks, and in a number of places they are known to roost in busy places, quite undisturbed by people and traffic. The Botanic Gardens in Melbourne has a wintering colony every year, that has been in existence since before the gardens were started. A few non-breeding juveniles also stay right through the year.

These herons build in colonies, constructing a slight nest of sticks at varying heights up to one hundred feet or so, and usually above water. In western Australia they have been recorded as nesting on the ground, although this is probably rare.

From two to four pale blue-green eggs are laid at practically any time of the year, depending on local conditions, although spring is a common time.

As will be seen from their Latin nomenclature, Reef Herons, *Egretta sacra*, are actually included in the same genus as the egrets.

This bird has two colour phases which interbreed; a

grey and a white. The resultant offspring are not intermediary phases, but either pure grey or white.

These herons, or egrets, are in the main northern birds, found in coastal areas throughout their range. They are recorded as uncommon in Tasmania.

As one progresses northwards, the white birds are found to predominate, while the grey birds are the only ones found in the south.

It favours rocky coastlines and reefs where, as the tide recedes, it may be seen hunting amongst the pools for fish, crustaceans and other small marine animals.

When not foraging at low tide, it will spend many hours standing hunched up on an outcrop of rock.

Unlike most of the Ciconiiformes, they do not nest in colonies. The two or three eggs, which are pale bluish-white, are laid on a simple platform of sticks which is 'lined' with smaller twigs. The nest is built in the lower branches of a bushy tree, amongst the sea-shore rocks, or on a rock ledge. The breeding season is often from September to January, but may be practically throughout the year, depending on local conditions.

## BITTERNS

The Little Bittern, *Ixobrychus minutus*, is a shy bird of the reed-beds and swamps. It seldom flies when disturbed but prefers to depend on remaining stationary and unobserved. It will sometimes stretch up to its full height in a typical bittern-reed-pose: alternatively, it may crouch and puff its feathers out into a ball. It is so loth to fly that it may sometimes be taken up in the hand, or caught by dogs. If this bittern does take off, it flies low over the reeds with slow laboured wing-strokes. In spite of being so wary it is sometimes recorded in large city parks that contain a suitable habitat.

They construct a slightly built nest of pieces of reed, grasses and other aquatic plants. This is usually placed a little above the water in a reed-bed. Sometimes a few nests will be built near each other by separate pairs of birds. The usual clutch is four white eggs which are laid about October or November.

Little bitterns are found in south-western Australia and eastern and south-eastern Australia. They are not recorded for Tasmania.

The range of the Brown Bittern, *Botaurus poiciloptilus*, is similar, although it is recorded further west, as far as the Adelaide plains. It is also found in Tasmania where its numbers are said to be dwindling.

This bittern may be seen singly or in pairs, haunting reed-beds and other sedgy areas. Haunting is an apt word, as their weird booming call is a most mysterious sound and is thought to be one of the sources of the aborigines' tales of Bunyips. In fact, it is more likely to be heard than seen, as its booming call, described as 'woomf', is repeated through the dusk and into the night.

A Brown Bittern will sometimes stand out on an exposed mudbank, head-in-air, perfectly resembling a mottled, rotting stump of wood.

They nest in the densest parts of swamp, bending down the reeds and flags and interlacing them into a hollow platform. Four or five olive-green eggs are laid during October or November, as a rule. The bittern's food is yabbies, small eels and fish or any other aquatic life it can catch.

The Black Bittern, *Dupetor flavicollis*, is largely a bird of the mangrove swamps. They roost by day in the trees and fly down to commence feeding at dusk.

If disturbed on the ground they are very elusive, running over the mud under the mangroves for a great distance before they will be flushed. This bird, if startled, will assume the bittern-pose; stretching itself upright and pressing its feathers close to its body.

It is recorded that if these bitterns are robbed of their eggs, they will immediately lay again in the same nest, or build another close by. They feed on water-insects, fish, frogs and other aquatic life.

The nest is a platform of sticks built in the branches of a tree, usually overhanging the water. The three to five eggs are white and the breeding season is September to January.

Mangrove Bitterns, *Butorides striata*, are predominantly coastal birds, found in the mangrove swamps. Their range extends from the mid-west, around the north of the continent and down the east coast as far as eastern N.S.W.

Singly or in pairs, they forage along muddy shorelines, bays and estuaries. These bitterns are wary birds and, when disturbed, fly off with a loud squawking call. They will also adopt the vertical attitude of the other bitterns as a means of camouflage, especially when in cover.

The nest is built of sticks in the upright fork of a mangrove and the two to four bluish-green eggs are laid about September or October.

The Red Mangrove-Bittern is given the name *B. rogersi* but there is some contention as to whether it is a separate species, or merely a red phase of the preceding bird. It is similar in habits to its relative, but its nest and eggs are not

recorded. This bittern is found only in mid-western Australia in the Onslow district.

## EGRETS

There are three white egrets in the genus Egretta and one, the Cattle Egret, which develops washes of yellowish-buff in the breeding season.

The largest of the group is *E. alba*, the Large or White Egret. This tall graceful bird may be seen stalking small aquatic animals and fish in suitable localities throughout the continent. It is also the only egret common in Tasmania.

In its breeding plumage this bird's yellow bill becomes largely black, and it grows long filamentous plumes on its back. It was for these plumes that it was once hunted. There was, of course, a far greater mortality than that caused by the adult birds being taken: with the parent birds gone, eggs and young were left to perish in the nests.

These egrets breed in colonies, often in association with similar species and cormorants. The nests are platforms of sticks built at varying heights in trees, in or close to water. They usually breed from November to January and lay three to five greenish-blue eggs.

*E. intermedia* is the middle-sized Plumed Egret. This bird, as well as developing the nuptial plumes on the back which project well beyond the tail, also grows ornamental feathers on the fore-neck and something of a head crest.

This egret is similar in habits to its larger relative but not as extensive in its range. The species *intermedia* is not recorded for south-western Australia or Tasmania.

Out of the breeding season it will be seen singly, in pairs or small groups, foraging through swampy land. It feeds on yabbies, frogs and anything of a similar nature that it can catch.

Like the other egrets, this bird nests in colonies and usually in association with various other species of egret and water birds.

The nest is a flattened platform of twigs and sticks, often with a few leaves interwoven. From three to five eggs are laid between October and December, or later, depending on local conditions of rainfall and water levels.

The Little Egret, *E. garzetta*, is found in suitable habitats throughout northern and eastern Australia and Victoria. They are seen occasionally in South Australia but very rarely in Tasmania. Throughout its range in this country it is nomadic and rather rare, although it may occur in some numbers in certain localities from time to time.

During the breeding season a few plumes develop on the back of the head and long lanceolate feathers grow on the fore-neck of the Little Egret. There is also great development of the beautiful train of plumes growing from the bird's back, and two 6" long plumes from the nape. The female is smaller and her plumes are developed to a rather lesser extent.

They forage in swamps and other wet places in the usual egret manner—stalking slowly forward for a few paces and then stopping quite still, sometimes for minutes at a time. They stare down into the water, and if some tit-bit comes within reach, the rapier-bill is shot forward on the long spring of the bird's neck. It is usually successful in snapping up what it aims for. These egrets are wary and if disturbed the bird circles high into the air, and flies off to some more secluded spot.

The usual platform of sticks and twigs is built in a tree growing in or near water. They nest in colonies, often in association with other water birds. Three to five pale blue-green eggs are laid from October onwards, depending on the locality and prevailing conditions.

Cattle Egrets, *Ardeola ibis*, were introduced into the Kimberley area in 1933 with some idea of counteracting cattle-tick. It may be that these died out, although some time later cattle egrets were seen in the area. Since then their numbers have been increasing, whether from the original stock, or by a natural spread of birds from S.E. Asia is not really known. However, this handsome egret is now firmly established and has been found breeding as far south as northern N.S.W. As a visitor it has also been recorded in the south west of the continent, and there are sight records for Tasmania.

In non-breeding plumage, this egret is white, but in its nuptial dress develops a bright yellowish-ochre wash on the head, breast and part of the back. It also grows head, neck and back plumes, the latter not being as long as the little egret's. The nest is a saucer platform of twigs and sticks built in a tree in or close to water. The three to six eggs are bluish-white. As with the other egrets, it breeds in the spring and summer, but the dates vary according to local conditions.

NANKEEN NIGHT-HERON 24 in.

## IBIS

In general the most common ibis is the Straw-necked Ibis, *Threskiornis spinicollis*. They are found throughout the mainland in suitable habitats, though rarely visiting Tasmania. They may be seen in any numbers from single birds up to large flocks hunting along the edges of swampy land or out in open pastoral country. They have even appeared on some occasions in the dry interior to feed on grasshopper swarms. In this respect, it is one of Australia's most useful birds, eating many other insects also, that are harmful to crops.

It is wide-ranging and banding has shown that some birds travel the length of Australia.

They build a nest of trampled-down lignum bushes, reeds, or other vegetation, with sticks and herbage added to give the nest substance. They are colony breeders, and in some favoured localities gather in thousands, often mixing with white ibis. The breeding season is about September to December, but may vary under different conditions. Three to five dull white eggs are laid which soon become nest-stained brown.

White Ibises, *T. molucca*, are found throughout the country and also in Tasmania, although they tend to be more common in the north and east. In 1952 there was an influx of Straw-necked Ibis into the southwest and amongst these were numbers of White Ibis. These seem to be establishing themselves, whereas, before 1952 they seldom moved lower than the Kimberlies.

It appears to be a somewhat shyer bird than the preceding species, although in some localities flocks will become bold in their pursuit of insects through cultivated areas. They hunt for small aquatic creatures in swampy land.

Their habits of feeding and general behaviour are similar to those of the Straw-necked Ibis and their two to five dull white eggs are laid in a similar nest.

The Glossy Ibis, *Plegadis falcinellus*, is a very different-looking ibis, being smaller and entirely dark. It is not uncommon in northern Australia but becomes increasingly rare as its range extends southwards. It is recorded as visiting Tasmania but rarely—perhaps forced over Bass Strait by exceptionally dry seasons on the mainland.

As with the other ibis, its feeding habits make it a valuable bird to farmers and pastoralists; it will even follow a plough to feed upon the insects turned up in the furrows.

Its nesting habits are somewhat different from the other ibis as it usually builds in the upright fork of a small tree, or in lignum bushes. The nest may be constructed of twigs, branches and leaves or entirely of leaves built up to form a hollowed platform.

The breeding season is usually from September to December, but may be delayed if the wet season is late. Three or four beautiful greenish-blue eggs are laid. These can vary in size from clutch to clutch that it sometimes might be hard to believe they belonged to the same species.

## SPOONBILLS

The Royal Spoonbill, *Platalea regia*, is found throughout the continent and Tasmania except for the area around the border of Western Australia and South Australia. It has not been recorded as nesting south of the Kimberlies in Western Australia.

It inhabits marshy land, wading far out into shallow swamps in search of molluscs and other small aquatic life.

These spoonbills choose various nesting sites; sometimes in trampled down reeds, in other cases they will build in bushes or quite high up in trees. During the breeding season the birds grow a crest of elongated crown feathers. October to May is the nesting season, although this may vary, and three or four chalky white eggs are laid that are smeared and freckled with yellowish or reddish brown.

The Yellow-billed Spoonbill *P. flavipes*, is found in suitable habitats over much of Australia, but is not recorded from Tasmania, Cape York Peninsula or the Centre. In Western Australia it is distributed through the coastal areas but it rarely nests south of the Kimberly area.

Except when in its breeding colonies, it is a wary bird. It has a habit of perching in dead trees, from which there is a good view—thus making it difficult to approach.

It takes similar food to the other spoonbill and, like it, feeds on water insects by sweeping its plate-ended bill from side to side through the water. Spoonbills also snap up small creatures from the mud and water.

The nest is a bulky structure of sticks built in a tree or near the water. Three or four chalky white eggs are laid about September or according to conditions.

## STORKS

The Jabiru, *Xenorhynchus asiaticus*, may be seen on stretches of fresh water or salt-water creeks and mudflats. It is distributed across northern Australia from the Fitzroy River to south-eastern N.S.W. and there are also a few sight records claimed for Victoria.

It stalks gracefully through the shallows, now and then rushing a short distance, or stopping suddenly to peer down into the water. Chasing its prey it will dash forward with long strides and wings half flapping, stabbing repeatedly at a fish or frog until it is captured. It is inclined to be solitary —even to the extent of chasing another Jabiru from the immediate area. The call is said to be a dull booming, but is not often heard.

Jabirus usually breed from about May to October or when conditions are wet enough. The nest is a large collection of sticks, either in a bush, the reeds of a swamp, the top of a tall tree or even on the ground. The four to six whitish eggs are laid on a lining of rushes or other herbage and soon become nest-stained.

RED MANGROVE BITTERN 20 in.

MANGROVE BITTERN 20 in.

# ANSERIFORMES

Ducks, Geese and Swans

The order of waterfowl, the Anseriformes is divided into two families, one of which, the *Anhimidae* (Screamers) is not represented in Australia. The other family, the *Anatidae*, has nineteen members in this country. This classification is further broken down into three sub-families: the *Anseranatinae* containing only the Pied Goose; the *Anserinae* containing in this country the Swan, the Cape Barren Goose, the Freckled Duck and the Tree Ducks. and the *Anatinae*, containing the rest of the ducks.

These two sub-families are divided into tribes, a rather loose term used to divide and group the various birds that appear to have affinities—it is about the arrangement of these tribes that some ornithologists disagree and much work is still being done to arrive at satisfactory answers.

The Black Swan is one of Australia's best known birds and is very common. Indeed, in some parts of the country, they flock in such overwhelming numbers in pastoral areas that they foul the water dams, compete with stock for grass, and consequently have to be reduced by shooting.

Cape Barren Geese on the other hand, are one of the rare birds of the world with a population of approximately 5,000. They are mainly confined to the eastern end of the Bass Strait, although there are small numbers on islands on the south coast of Western Australia. The birds are rigidly protected by law at most times although a few are still illegally shot in the Bass Strait islands. In 1965 there was a very contentious although short open season, when a number were shot. Although this has probably done them little harm as a species, a mere 5,000 birds or so would not stand much chance with repeated shooting seasons. Placed by some ornithologists with the shelducks and by some with the geese, this bird has affinities with both and may be a link between them.

Pied Geese are another aberrant species. Primitive and distinct as they are, these geese are now usually placed on their own as the *Anserratinae*. They are peculiar in having their feet only partly webbed, and the hind toe long and on the ground. Their moult is also distinct, in that they have a gradual wing moult, instead of losing all their flight feathers at once.

Also a distinct group are the Tree or Whistling Ducks of which we have two. They are long-necked and long-legged and have a most un-ducklike whistle. These ducks are considered to have some affinities with the geese.

Lastly, in this sub-family is the Freckled Duck, one of our less common waterfowl which is in a tribe of its own. It is rather a plain brownish-grey bird, palely freckled all over, but in the breeding season the male develops a bright vermilion base to its bill.

This leaves thirteen 'typical ducks' in the *Anatinae*, divided amongst five Australian tribes. First there are the two large and handsome Shelducks, one of which tends to be a northern bird, the other a southern species.

The river ducks are the most numerous, having six species. These include the well known Black Duck and the Grey Teal which bear the brunt of the duck shooting season, the Chestnut Teal, a more handsome and less common relative of the Grey, and the Blue-winged Shoveller, an even more striking bird, found throughout the continent except for the far north. The Pink-eared Duck is probably an aberrant river-duck and fairly common though local over most of Australia. It is unusual amongst river ducks in that it nests in trees. The Pochard tribe is represented by one bird, the White-eyed Duck, which is found around most of Australia. It is an habitual diver and it can stay under water for some time, gathering food from the bottom mud.

The perching ducks, the *Cairinini*, are represented in Australia by a typical member of the tribe—the Wood Duck or Maned Goose. This bird is usually found along the timbered edges of billabongs, water courses and flooded timber. It perches frequently in trees and nests in them also, usually in the hollow spout of a broken limb.

Classified broadly with the perching ducks are our two pygmy geese, which have stubby goose-like bills but also have affinities with ducks. They are typically birds of Northern Australia but vagrants are recorded further south. These birds frequent timbered creeks and lagoons and tend to nest in trees.

Lastly come the Stiff-tails, the *Oxyurini*. These are highly aquatic birds, with their short legs placed so far back on their bodies that they waddle clumsily on land. There are two species in Australia, the Musk Duck and the Blue-billed Duck.

The male Musk is a very large duck which has a pendulous flap of skin under its bill. They have striking displays in which they show off before the female, jetting the water out from under their wings, splashing with their feet, calling, and swimming about in strange attitudes.

They wallow in the water and can dive with remarkable rapidity, and it is claimed by some that they can out-dive a gunshot. Musk ducks are seldom seen to fly and in spite of their extreme awkwardness on land some observers say that they prefer to walk from swamp to swamp. Any changes of feeding ground, either by walking or flying, are usually done at night.

The other stiff-tail is the much smaller Blue-billed Duck. Like its larger relative, this bird can carry its tail vertical, the short pointed feathers standing up like a fan—a habit used considerably in displays. The Blue-bill is also difficult to put up, preferring to dive rapidly to escape danger. It also runs, skittering over the surface of the water, with its wings rapidly beating, even though it does not become airborne. Both these birds make similar nests in clumps of rushes and are inclined to build a canopy of rushes over the nests probably as a protection against marauders.

## TREE DUCKS

The Whistling Tree-duck, *Dendrocygna arcuata*, is primarily a northern bird where it sometimes occurs in large numbers on inland lagoons and billabongs, frequently in mixed flocks with the other tree duck and other waterfowl.

Occasionally they are seen in N.S.W. and southern Queensland, but rarely in Victoria or in the south of Western Australia.

It feeds out on the plains at night returning to the water to nest and preen through the day. These ducks also roost in trees during the day; they have an un-duck-like whistling call.

They feed on young grass, the bulbs of rushes and other herbage. The nest is merely an unlined hollow on the ground in which the bird lays a large number of eggs—up to 15 have been recorded. They are creamy white and rather pointed at both ends.

The range of the Plumed Tree-duck, *D. eytoni*, is wider than the previous bird, extending southwards into N.S.W. and it is recorded in Victoria. Occasionally it reaches Tasmania. In the west it comes less far south, even as a visitor and there are no breeding records further down than the Kimberly area.

Where they are common they congregate in considerable numbers with other waterfowl on stretches of fresh

water, preferring the shallows, where they stand about all day preening and sleeping. Its call is a loud sibilant whistle.

In the breeding season it leaves the water and nests on the grassy plains. Both birds share the duties of incubation, the change-over taking place in the evening.

The eggs are laid in a hollow on the ground lined with dry grass and usually concealed by long grass or other plants. Up to twelve glossy pale cream eggs are laid and the breeding season is from September to December or sometimes later.

## SHELDUCKS

The Chestnut-breasted Shelduck, *Casarca tadornoides*, is a typical looking shelduck that is found throughout southern Australia, except for the Nullabor district; from the tropic

CHESTNUT-BREASTED SHELDUCK 27 in.

BLACK DUCK 24 in.

WHITE-HEADED SHELDUCK 20 in.

CHESTNUT TEAL 18½ in.

of Capricorn down through Western Australia, across South Australia to Victoria, Tasmania and southern N.S.W. although it is rare about Sydney.

It is a wary bird, though not much shot at, being rank in flavour. It is usually seen in small flocks and often feeds out on paddocks well away from water. This duck is also a great frequenter of tidal flats and estuaries.

These shelducks nest in a variety of places: a hole in a tree which may be close to, or far from water, or a rabbit burrow. In Western Australia, they are recorded as nesting in deep crevices between the rocks on Rottnest Island. Up to eighteen eggs have been found but it may be that such large numbers would be the work of more than one female.

The nest is made of grass and the glossy, creamy eggs are laid in a great deal of down. Breeding season is from July to December.

White-headed Shelducks, *Tadorna radjah*, are found from N.W. Australia across to Queensland.

Solitary birds are quite often seen, otherwise they travel in pairs or small groups. They are not recorded in great numbers as the other shelducks sometimes are.

They feed in shallow water, often mangroves and tidal flats, in search of molluscs, small crabs and aquatic plants.

The breeding season is from December to February, sometimes later, and the nest is in a hole in a tree: up to eleven creamy white eggs are laid.

## RIVER DUCKS

One of the best known ducks in Australia is, no doubt, the Black Duck, *Anas superciliosa*, which is actually a greyish brown colour. Large numbers of these birds are shot each year in the duck-season but breeding programmes, bag limits and strict protection during closed-season protect them as a species.

Except for desert areas, they are found in most parts of the continent and Tasmania. Single birds, pairs or flocks, which may number hundreds in some localities, are seen.

Black Duck frequent any kind of fresh water and may sometimes be flushed from surprisingly small patches of water. They also visit the sea, and forage along tidal flats, estuaries, and swim in the shallows hunting for food.

Banding has shown that these duck make considerable journeys within the continent.

Normally they breed from July to December. The nest may be built in a variety of situations: amongst rushes or long grass near water, in cover a distance from water, deserted nests of other species and up in the hollow limb of a tree. It appears in the latter case that the young are sometimes carried down on their parents' backs or carried in their beaks, and in other cases simply pushed out.

Eight to thirteen creamy or greenish eggs are laid in feathers and down.

The Grey Teal, *A. gibberifrons*, is probably as well known as the last bird. It is distributed throughout the mainland and Tasmania. Singly, in pairs or in flocks, they frequent marshes, open lakes and water courses of all kinds. It is found on salt-water flats, and estuaries as well as on fresh water.

These ducks are great wanderers—banding has shown that they travel right across the continent north to south, east to west and in the opposite directions.

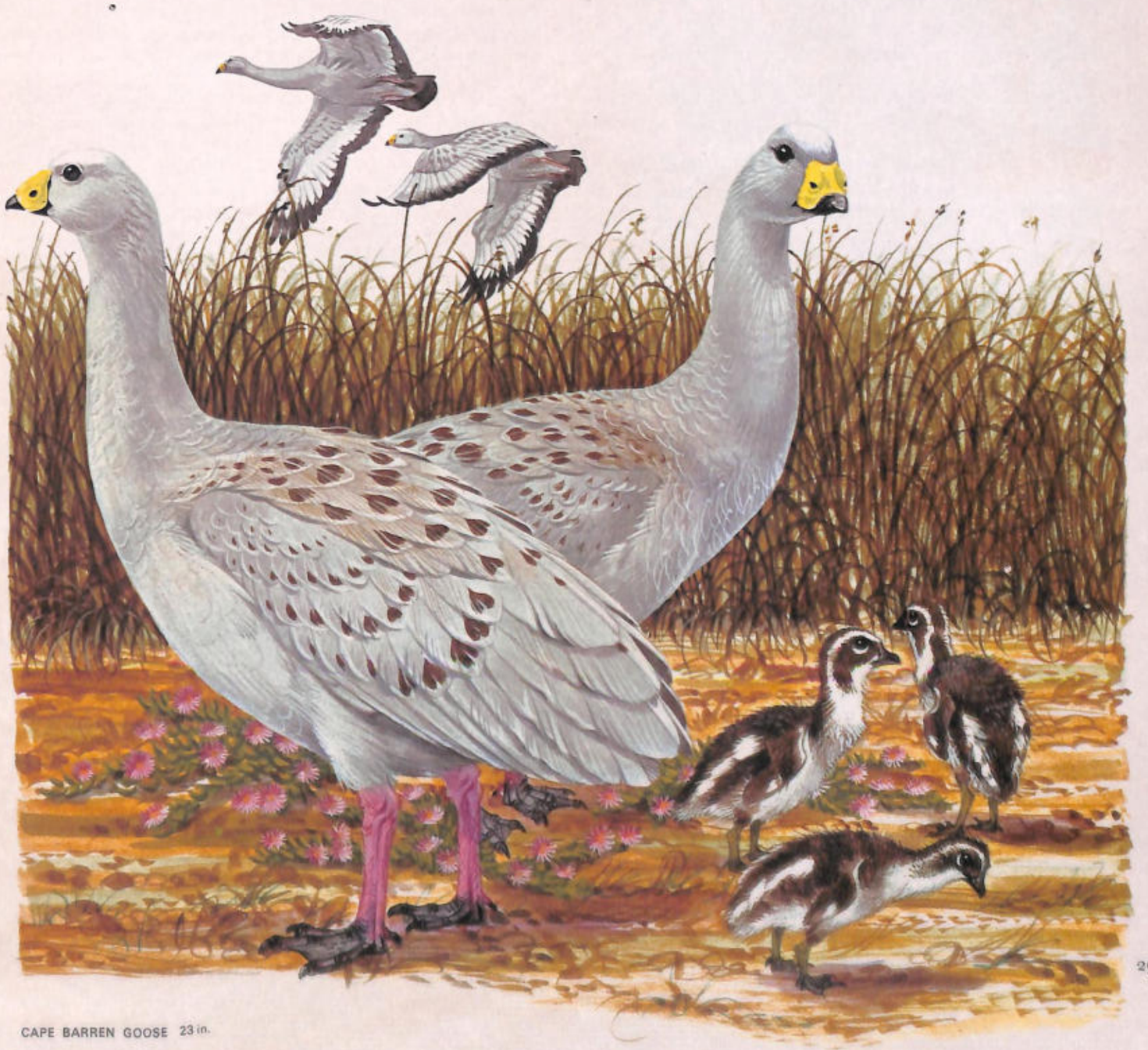
This duck breeds at any time of the year according to the local rainfall. The nest of grass, which is lined with down, may be concealed in a clump of herbage or built in the hollow limb of a tree. The eggs, about ten or twelve, are creamy white.

The Chestnut Teal, *A. castanea*, is a very handsome bird found in similar habitats to the grey teal: some observers consider that it is less fond of salt-water habitats. Its range is from south eastern coastal Queensland down to Victoria and across southern Australia (excepting the Nullabor) to south western Australia and occasionally up to N.W. Cape. Tasmania is considered to be one of the bird's strongholds.

The breeding season is from June to December, and the nest is similar to the other teal except that it is less frequently on the ground. The eggs are also similar to those of the grey but the down in the nest is darker.

Blue-winged Shovellers, *A. rhynchotis*, are found in Tasmania and in suitable localities across the continent except for the far north. It is not common in Western Australia.

This is a shy bird, keeping far out on open water as a rule, although they will frequent small water-holes if undisturbed. In flight, the wings have a distinctive whistle which is rather loud.



CAPE BARREN GOOSE 23 in.

The nest is built on the ground, usually in thick cover. In Tasmania it is described as 'beautifully roofed with fine grass and rushes bent down from growing plants.' I can find no record of this for other parts of Australia. August to December is the breeding season and from four to eleven glossy white eggs are laid.

The Freckled Duck, *Stictonetta naevosa*, is a problem for taxonomists but has recently been placed in the *Anserinae*. It may be the rarest duck in this country. It is found in Tasmania where it is an irregular visitor, being common at times and then more or less absent for some years. On the mainland it is chiefly an inland bird, found northwards to the Flinders River in Queensland and N.W. Cape in the west. Its main breeding areas are centred around the river systems of the interior of N.S.W.

It has long graceful wings (although not large in proportion to its body) and is a rapid flier. Freckled ducks also spend much of their time resting on logs and mud-banks. They feed mainly on aquatic plants.

This duck may nest in an old coot's nest or something similar, or it builds its own of grass and other material, which is then filled with down. The bird is recorded as building a nest of small sticks in thick bushy trees, just above or at water level. There are five to twelve eggs laid which are very similar to those of the Black Duck. Breeding is from September to December.

The Pink-eared Duck, *Malacorhynchus membranaceus*, is considered to be an aberrant river duck. It inhabits Tasmania (where it is rare) and the mainland of Australia, and is normally seen in pairs or small parties on shallow lakes and swamps. In some wet seasons there are enormous increases in its numbers.

It feeds by working over the surface of the water for microscopic insects and plants which are held back by the fringed lamellae along the sides of the bill whilst the water is strained through.

They also plunge their heads below the water in search of food. There are conflicting reports from various sources about this bird's underwater feeding habits—some say that it sifts through the bottom mud, others report that it does not.

Pink-ears lay in old coots' nests or something similar, or build in herbage near the water. Hollows in trees are also used. The six to eight creamy white eggs are laid in a mass of down.

## POCHARDS

The White-eyed Duck, *Aythya australis*, is the only Australian member of this tribe. It is reputed to be the fastest flier of all our ducks. It is common in Tasmania and also found throughout Australia except perhaps for the driest parts of the interior. This is a diving duck, and it finds most of its food underwater in the mud. They are normally shy and wary and frequent quiet swamps and streams.

The nest may be a hollow on the ground lined with grass, in the hollow of a broken branch or constructed in a thick bush growing in or near the water.

The breeding season is from September to December as a rule and the eggs, up to 14, are creamy-white and laid in much less down than those of most ducks.

## PERCHING DUCKS

The Maned Goose, *Chenonetta jubata*, or Wood Duck, bears characteristics of both the geese and the ducks.

It is found throughout most of Australia and also Tasmania, where it is rare. It frequents wooded water-ways, perching often on trees and logs. These ducks also frequent damp grasslands where they feed on the grass and other plants.

Wood Ducks lay their six to ten glossy cream eggs in a quantity of down. This is often placed in the hollow spout of a broken limb, or a nest of grasses may be built in the cover of coarse herbage. The breeding season is varied and may be at almost any time, depending on local rainfall.

Classified broadly with the perching ducks are the two Pygmy Geese or Cotton Teal. They are both rather goose-like little birds but have, however, definite affinities with the ducks.

The Green Pygmy Goose, *Nettapus pulchellus*, is distri-

buted across the northern parts of the continent although not occurring very far inland. It extends from the King Sound area eastwards to about Broad Sound on the Queensland coast.

Found in small groups on the lily lagoons, these handsome birds are one of the delights of the tropical north. In the dry season they congregate in larger numbers as the small pools dry up. They are shy birds and quick to fly; on the wing they utter a peculiar whistling note.

Their food is small aquatic animals and plants. The nest is built either in swamp vegetation, on drier ground, or in the hollow of a tree. Data on clutches and nest construction is scanty but eight to twelve eggs are probably a common clutch. Their breeding is related to the wet season, and they lay eggs from about January to March, and these are white or creamy-white, with a smooth lustrous shell.

White-quilled Pygmy Geese, *N. coromandelianus*, are much more restricted in their range, being found only down the eastern coast of Queensland and a short distance inland. Their habitats are the billabongs and lagoons of rivers along the coastal plains, and the few fresh water lakes within their range. Not a great deal is known of the life history and habits of these birds. Their main breeding season appears to be from January to March—from the middle to the end of the wet season.

Their food is almost entirely vegetable matter, and they apparently do not dive as frequently as the former species.

The usual site for nesting is a tree hollow either over the water or up to two hundred yards away. Clutch size varies considerably—from six to twelve have been recorded in Australia. Eggs are pearly white, oval and without a pointed end.

## STIFF-TAILS

The Musk Duck, *Biziura lobata*, is a fairly common bird throughout its range which is throughout southern Australia to Point Cloates in Western Australia and north-east Queensland. It is also common in Tasmania. It is much more common in Western Australia than it is in the east; out of the breeding season many hundreds may be seen on lakes and estuaries in Western Australia.

They are seldom seen in flight although it appears that they do fly more than most text-books indicate. Most changes of locality are made at night. In spite of having their legs set so far back, which makes them clumsy out of the water, they are said to walk from swamp to swamp during darkness. They are sometimes seen at sea in the winter.

They swim low in the water often with their backs more or less awash. Musk Duck dive frequently when feeding and dive to escape danger—even shooting—rather than take to the wing.

Young birds have been seen riding on their parents' backs, and going under when the adult bird dives, rather in the manner of grebes.

The male has a strong musky odour. The drakes also have a highly developed display, which includes the jetting of water from under his wings by snapping them shut against his body. He will also display to the female by swimming about her, with head thrown back, the lobe under his bill distended, and flicking his spikey tail up over his rump. He also spins in the water in this attitude and calls with a loud 'plonk' sound and a whistling cry.

The eggs are large for the size of the bird and laid in a quantity of down. The nest is usually a large platform of trampled reeds or other herbage, with the surrounding growth bent down and worked into a canopy: it may also be built in a thick low bush in or near water. There are two to six eggs with a limey coating over a greenish shell. The breeding season is from August to December.

The other stiff-tail is the Blue-billed Duck, *Oxyura australis*. It is confined to south-western Australia, south-eastern Australia to southern Queensland and Tasmania, where it is noted as uncommon. It is a shy duck spending much time in thick cover and may be more common than it appears throughout much of its range. It is recorded as plentiful in Western Australia.

They are wary birds, usually staying well out on open water and diving to escape danger. Like the Musk duck they must do most of their flying at night, as they are almost never seen on the wing.

Blue-bills float low in the water as a rule, and the tail may lie flat on the water or be carried more or less vertically.

They dive for most of their food and stay under water for considerable periods. They have a chirruping call—quite unlike a duck.

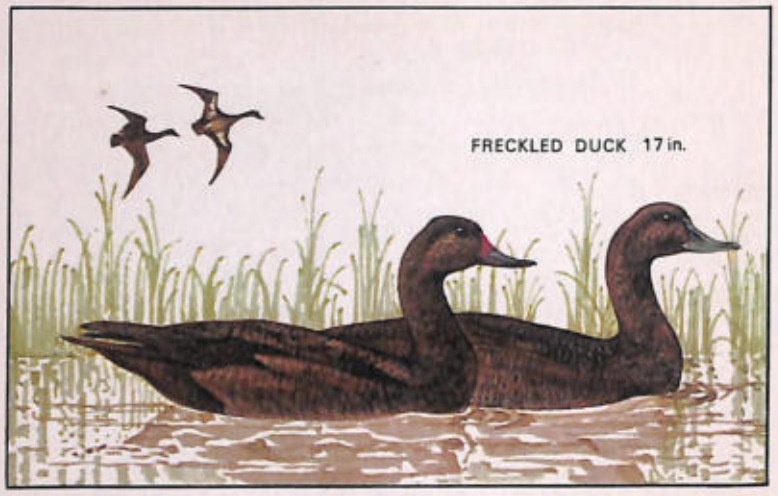
A bulky nest is built of trampled down reeds and sedgy growth and it often has a canopy of reeds pulled over it. Often an old coot or musk duck's nest is used and some nests have been recorded made of light sticks.

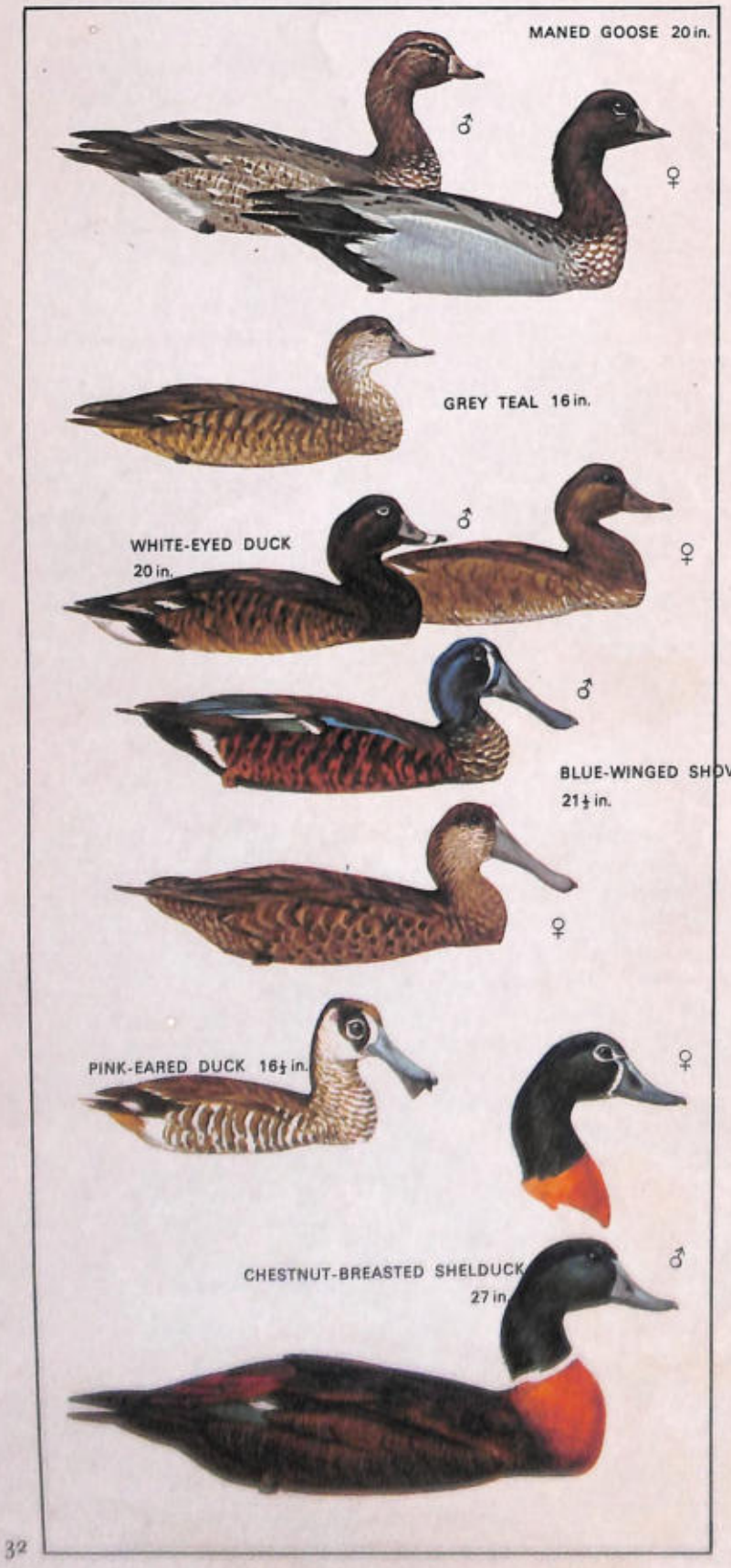
Much less down is used than in most ducks' nests and the four to six greenish eggs are large for the size of the bird. Breeding takes place from October to January.

## GEESE

Cape Barren Geese, *Cereopsis novae-hollandiae*, are named after one of the larger islands in the Furneaux Group in Bass Strait. This group of islands is their main stronghold, although a few breed further west along Bass Strait and there are a small number on islands off the south coast of Western Australia. Recently they have been discovered nesting on islands off Wilson's Promontory, Victoria.

It is a puzzling bird to taxonomists, having affinities with both the true goose, and with the shelduck, of which it may be a primitive form. The patterning of the chicks in down is rather shelduck-like but its skeleton is similar to that of a goose, without being entirely so.




The female has a rather pig-like grunt and the male trumpets, a wild sound which one soon learns to associate with grey seas and windswept islands.

These geese are thought to number somewhere in the region of 5,000, although various ornithologists put it higher or lower. They are being studied currently, and their movements and numbers are still being assessed. During the summer many leave the islands and fly to various parts of the mainland to feed in pastures. Numbers appear to be regular visitors to the Victorian Western District, they also appear in South Australia—there is even a record of one on the Murray River in northern Victoria.

During the winter these eastern birds return to nest on the Bass Strait islands, starting about May or June. Both birds build the nest which is a large flattish structure of grass and other plants. The birds line it with their down. The four to seven eggs are a creamy white and take thirty-five to forty days to hatch. The young geese do not attain maturity until three years old.

There are a certain number of complaints from farmers who have found that a flock of four or five hundred of these geese can be a considerable nuisance, fouling dams and getting into crops. It is possible to frighten these birds off without actually killing them, and it would seem that when a bird reaches a world-population of a few thousand an open season is a risky business. A number are shot 'for the pot' by the local island people, in spite of the strict protection laws, and this probably does little harm, but to attract a large number of shooters with an open season is another matter.

The Pied Goose, *Anseranus semipalmata*, in a sub-family of its own, is found at the opposite end of Australia. Many years ago there were breeding colonies as far down as southern Victoria. At present it is primarily a bird of the north, although in Western Australia there are sporadic movements southwards. In the east it is recorded as far south as northern N.S.W., but only rarely in northern Victoria. It is listed as 'accidental' to Tasmania.

These large black and white geese flock in thousands on the lagoons of the north, presenting a handsome picture as they wade amongst the blue and pink water-lilies. Frequently the white underparts of the birds are stained reddish brown from the water.

Pied Geese have been a problem in many of the experimental rice-growing areas, crowding to the 'paddy fields' to feed on the young plants. Time-guns have been set, but the birds soon become inured to the detonations and the problem seems to be insurmountable.

As well as feeding in the shallow waters, the geese forage across the open plains, mixing with the buffalo and creating a scene that hardly looks Australian. They also perch in trees a great deal.

If a male one of these birds is skinned, an enormously developed trachea will be found lying under the skin in two loops along the side of the breast. This may be three or four feet long altogether, and gives the male's call a very much deeper ring than that of the female. This tube is seldom present in females, and if it is so, then is only a couple of inches long. The female is also a smaller bird and the knob on the crown is usually smaller, although this develops in both sexes with age.

The cone of both birds is coloured yellowish and pink—brighter in the males—and it glows redder in the case of the male when it is sexually aroused.

As indicated by its specific name the toes of this goose are webbed for only about half their length.

It is a hard bird to classify and by some students it is considered as being close to the true geese, whilst others consider it an aberrant perching duck. At the moment

this 'goose' remains in a tribe of its own.

The Pied Goose builds a large nest of mud, weeds and rushes, often starting the foundations of the nest underwater. Alternatively, it may be on a tussock or small island in the middle of a swamp.

Breeding may take place from January to March or from July to December, depending on the arrival of the monsoonal wet season. Four or five glossy white eggs are laid by each female, but more than one female will sometimes lay in a nest.

## SWANS

The Black Swan, *Cygnus atratus*, is our only native swan although a few European White Swans, *Cygnus olor*, have been released in places and are breeding in the wild without showing any inclination to spread; nor do they appear to be increasing their numbers.

Black Swans were first seen by Vlaming in 1697 when he sailed into the estuary of what is now the Swan River in Western Australia. It is the state bird of W.A.

They are seen in pairs frequently, but also in flocks which may number thousands. This swan is found all over the continent and Tasmania, wherever suitable habitats exist, except in the far north-east, although it is reported to be extending its range in that direction.

It is a particularly common bird on the pastoral lands of Western Victoria where some properties might carry 20,000 birds or more. Unluckily for the farmer, this bird is not migratory, merely moving from one feeding ground to another within a relatively small area. In 1960 it was agreed by the authorities that they had become a pest in Victoria's Western District. Many were shot, but enormous numbers still remain.

Seen through the eyes of the bird-watcher rather than the farmer, the swan is a romantic and beautiful bird. A flock of a thousand or so gracefully swimming on a lagoon, the elegant necks arching down as they feed, and their ruffled plumage gleaming in the sun is a grand sight. Now and then a bird will call and the sad soft trumpeting echoes over the water.

Should they be disturbed sufficiently the nearest ones will take off and as each wave of birds passes over the birds below, those in turn will take off. They run across the water, churning it white, and the air is filled with the roar of thousands of great black and white wings, their wild alarm calls and slap of pinions on the surface.

They tend to move from one feeding ground to another mainly at dusk, trumpeting to each other to keep in touch; they also are active on moonlit nights. As well as fresh water habitats, the swan is frequently seen in sea-bays, estuaries and sheltered coasts. They feed in the shallows just off-shore, eating aquatic vegetation, grass and small water creatures.

Swans nest now and then in isolated pairs, but normally in large scattered colonies, small sedgy islands on a lagoon being a favourite site.

The nest is constructed of whatever materials are to hand, twigs, rushes, weeds and so forth, and is situated on sedgy islands or built up in shallow water. It is usually rather bulky and lined with the bird's own down. Five or six greenish white eggs are laid in autumn or winter, but sometimes as late as December.

# FALCONIFORMES

Birds of Prey

We are fortunate in Australia in having such a wide range of birds in this order. We have one of the largest eagles in the world, a number of dashing and beautiful falcons, shy harriers sailing over our marshes, dainty kestrels that even live in our cities, and many others besides.

All except three species of our birds of prey are protected but this does not stop many a farmer and grazier reaching for a gun every time a bird of prey floats into view. Fortunately there is a growing awareness of the good that many of these birds do, in the controlling of vermin and the cleaning up of carrion. It seems unlikely that we will come to the stage of organised killing, such as takes place in some states of America, where eagles are hunted from the air. One aeroplane accounted for twenty-three eagles in six hours; there is also another pilot's claim—perhaps somewhat exaggerated—of shooting down 8,000 eagles in seven years.

However, in Australia we have no cause for complacency as a drive along country roads will show. How many times has one seen the bedraggled corpses of eagles strung along the barbed-wire fences—trophies of rifle shooting and poisoning. These dead birds are evidence of a very basic ignorance about the feeding habits of most eagles, and the important ecological niche that they fill.

It is undoubtedly true that *some* wedge-tails take lambs, but it is also true that except for a few 'rogue' birds, they do far more good than harm by killing hundreds of rabbits every year.

The results of close checks being kept on nesting wedgetails suggests that many of these feed themselves and their young almost exclusively on rabbits. The balance of their diet is made up of rodents and small marsupials.

One answer to legitimate complaints by the sheepman might be to have inspections carried out by experienced field-workers and, if necessary, a licence granted to shoot a certain bird or number of birds.

A fairly recent and more insidious cause of depredation is the intake amongst birds of prey of the poisonous insecticides which are being developed and used against the advice of most biologists. Insecticides such as those based on dieldrin and heptachlor are 'accumulative'. That is to say these chemicals accumulate in the soil and water, and in the bodies of anything that lives and feeds in the contaminated area. A typical example of this is the use of an insecticide on water to kill mosquitoes. Water plankton, imbibing the chemical, concentrate it two hundred and fifty times. In the fish that feed on this plankton it might be concentrated five hundred times. And finally, the birds which eat the fish—birds that will be picked up dead—the poison is concentrated eight thousand times. And this takes place even when the chemical is applied in as diluted a form as one part to fifty million parts water! Many birds of prey are particularly vulnerable in this sense, being fish and bird eaters.

The danger from these pesticides is two-fold. Firstly, in the direct killing of the bird when the concentration reaches a certain point—and also in the increasing number of infertile eggs being laid.

In Scotland a survey over a wide area from 1961–63 showed the percentage of Golden Eagles rearing young was only 27% compared with 72% between 1937–60. Analysis of the infertile eggs showed a significant amount of dieldrin, DDE and other chemicals.

The same thing is happening and will continue to happen in Australia, whilst such poisons are used as insect, weed and rodent killers. What gives the whole problem a rather macabre, though ridiculous twist, is that the more these harmful pesticides are poured on to the earth and washed into the rivers, the greater the number of insect and rodent-eating birds killed. Thus the agriculturalist is upsetting the delicate ecological balance; a balance which controls these very pests which he is trying to reduce.

WHISTLING EAGLE ♂ 20 in. ♀ 23 in.

The Birds of Prey, or Falconiformes, are divided into three families the *Accipitridae*, the *Pandionidae* and the *Falconidae*.

There has been considerable confusion in the application of popular names amongst these birds, but they will be dealt with below under their correct classifications. In the first family we have one typical *Aquila*, the Wedge-tailed Eagle, with a bare face forward of the eye, deep, strongly hooked beak, tarsal feathering down to the toes, and strong legs and feet.

Our other eagle, in the genus *Hieraetus*, is the Little Eagle, a smaller, longer-toed bird which has two colour phases.

The White-breasted Sea-Eagle, in yet another genus—*Haliaetus*—is found round most of our wilder coastlines and also inland, on large stretches of water.

The Red-backed 'Sea-eagle' and the Whistling 'Eagle' are actually kites. The first is the well known Brahminy Kite, a coastal scavenger of India and the islands north of Australia. The Whistling Kite is also a scavenger but is normally found inland.

Four other kites are found in Australia. The Fork-tailed is a typical kite and the same bird that is found in Europe. The Square-tailed Kite is a local bird, often seen in considerable numbers about killing yards in the bush.

We also have two delicate grey birds in the genus *Elanus*, the Black-shouldered and Letter-winged Kites. They are similar in coloration except for the black markings on and under their wings. These kites have the habit of hovering rather like kestrels.

The next bird, the Crested Hawk, is in the genus

*Aviceda*, the cuckoo-falcons. These birds are distinguished by having a double notched upper mandible. They are long-tailed forest birds and many have crests.

The Black-breasted Buzzard is not a true buzzard but resembles one in various ways. Its flight silhouette particularly is buzzard-like with its broad wings and rounded tail, although the head is more like that of a kite than a buzzard's.

Australia has three typical Goshawks in the genus *Accipiter*, and a similar bird, the Red Goshawk in a genus all on its own, *Erythrotriorchis*. This bird is shorter-tailed than most goshawks and slightly different in its habits.

The three *accipiters* are the Brown Goshawk, its near relative the Grey Goshawk, which has a white phase and the Collared Sparrowhawk. These are birds of the timbered country, hunting by dashing at high speed between the trees in pursuit of small birds.

Two birds of the open marshes are the Swamp Harrier and the Spotted Harrier, both in the genus *Circus*. These are typical harriers that may be seen flapping and gliding over inland swamps and salt-marshes.

The second family, *Pandionidae*, contains only the Osprey. The Australian bird is a variation of the species, which is found all over the world except for the Arctic and the Antarctic. It lives only on fish which it captures by plunging down to the water and grasping the fish with its specially adapted talons.

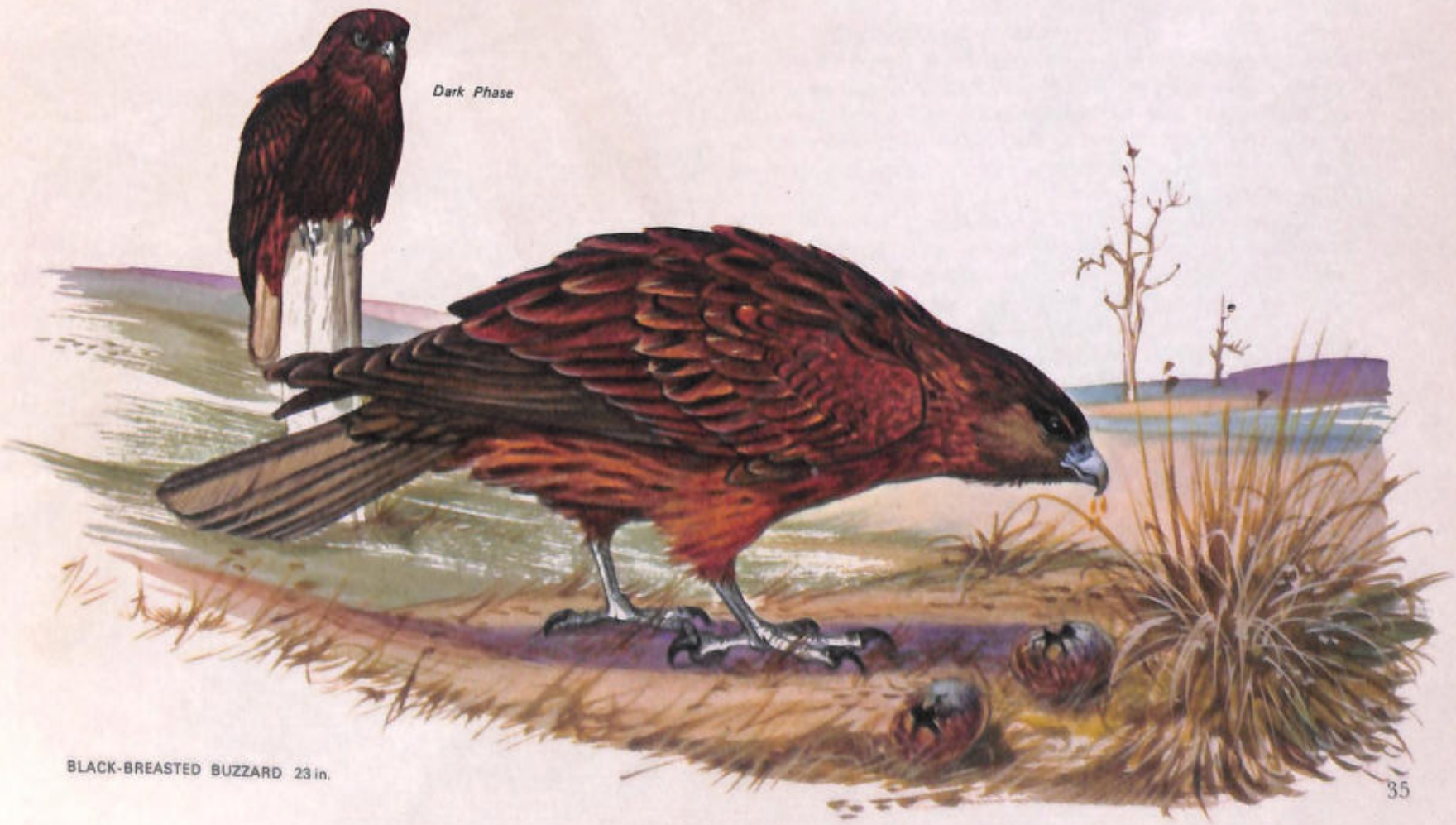
The third family, the *Falconidae*, contains six species in Australia, all in the genus *Falco*. One of the best known is the Peregrine Falcon, a bird which is found all over the world in slightly varying forms. They are birds of great dash and spirit in the chase, and are one of the most prized birds in falconry. Peregrines are credited with enormous bursts of speed and their dive, or 'stoop' as it is called, has been timed by aeroplanes at 175 m.p.h.

Similar looking but smaller, is the Little Falcon, a fairly common bird also with considerable dash, that frequently strikes upwards at its prey rather than 'stooping.' The Brown Hawk, which would be better named the Brown Falcon, is the most common bird of prey in many districts although there appears to be less of them in the far north. These birds have various colour phases, the extremes being light and dark browns, with many examples of gradations between the two.

Another common member of this genus is the Delicate Kestrel, the only falcon in which there are colour differences between the sexes. These birds may be seen hovering in a very precise and expert manner over paddocks. Hanging in the air, they suddenly drop a few yards, hover again, drop and hover; and so they come down in steps, following the movements of their prey with down-turned head. The last dash down to earth is usually made with half-closed wings, as this small falcon stoops at a mouse or some other creature. They also frequent cities, often nesting on inaccessible ledges on tall buildings.

The other two Australian falcons are much less common than the preceding species, and none of them are recorded from Tasmania.

The rarest is probably the Grey Falcon, which is a bird




BLACK-BREASTED BUZZARD 23 in.

of the inland, extending to coastal districts only in Western Australia where it may be slightly more common than in the east. The Black Falcon, on the other hand, appears to be very rare in Western Australia. Where it occurs, it is chiefly an inland bird, appearing in coastal areas in only a few places.

Both these falcons are recorded as often laying in the abandoned nests of other birds. As a general rule with all *Falconiformes* the females are larger than the males, sometimes considerably so.

## EAGLES

The largest bird in this genus is the Wedge-tailed Eagle, *Aquila audax*; it is also about the fourth largest eagle in the world. There is perhaps, a slight tendency growing amongst landowners, to consider the ecological niche of these eagles and their undoubted value in keeping the rabbit population down. Many are still shot and poisoned, however, and there will no doubt, always be the man who takes up a gun at the sight of any bird of prey. In Tasmania the bird is protected, whereas in Western Australia, for example, there is a bounty of 50c. on its head.

They frequent open country and timber ranges alike, usually nesting in rugged tree-clad hills. They build a vast structure of branches and sticks, which the birds add to year after year. Unless some mishap overtakes one of them, these eagles appear to pair for life. Fresh gum-leaves are added to the nest at laying time and the one or two eggs are laid in the winter as a rule.

Some eagles *are* lamb-killers, but most of them feed on rabbits, the young of dingoes or kangaroos and carrion. They will also drive foxes and other birds of prey off their kills. In some localities where there are no trees, such as blue bush country, this eagle will build in low bushes. They also build on rock ledges in the mountains, on sea cliffs, or on secluded islands, amongst low rocks. They are distributed throughout the continent generally and also Tasmania.

The Little Eagle, *Hieraaetus morthnoides*, is a much smaller bird found on the mainland but not in Tasmania. This eagle has a distinctive high-pitched double whistle. It does no harm to stock and in some areas feeds almost entirely on rabbits. Lizards and small mammals are also taken, so there can be no reason for this bird being persecuted. It favours timbered country and localities with watercourses, except in Western Australia where it is recorded as being a bird of the drier areas.

If they build a nest it is a typical eagle's nest of sticks, but they frequently use the old nest of some other bird such as a crow. A lining of fresh gum-leaves is laid down on which one to three eggs may be laid about August or September. These are whitish, speckled and smeared with reddish brown; some eggs are almost unmarked.

White-breasted Sea-eagles, *Haliaetus leucogaster*, are striking grey and white birds that frequent both salt-and fresh water. They are distributed around our wilder coastlines and Tasmania; in a few localities they move inland to extensive lakes and reservoirs.

This bird is largely a scavenger and consequently very useful. On rare occasions it will prey on lambs, but its normal food is the offal of the tide-lines and small mammals, eels, tortoises and crustaceans.

The nest is a great pile of sticks, lined with a few leaves. It is larger and more hollowed out in the centre than a Wedge-tailed Eagle's nest. It may be built in a tall tree, dead or living, over looking the water, or it might be found on a cliff-ledge. Two white eggs are laid and the breeding season is usually May to October.

Red-backed Sea Eagles, *Haliastur indus*, or Red-backed Kites as they are now more properly being called, are northern birds; found around our coasts and islands from Carvarvon in the west to the Hunter River in the east.

Its food consists chiefly of fish, crabs and other life of the seashore and mangroves. In some areas they are quite common and become bold in their search for carrion and other flotsam in harbours. Their call is a tremulous and mournful 'Pee-ah-ah-h', a thin drawn-out cry that soon becomes associated in one's mind with lonely tropical beaches.

The nest is built of sticks in a tree—frequently in a

mangrove. It may be decorated with streamers of bleached sea-weed. The two eggs are a bluish-white, lightly speckled chestnut. The breeding season is from April to September in the north, and August to October on the east coast.

## KITES

The Whistling Kite, *Haliastur sphenurus*, until lately has been known as the Whistling Eagle. It is a true kite, however, with typical kite-like habits.

The bird is found throughout the continent but is very rare in Tasmania. It frequents all types of country including the littoral, where it feeds on all kinds of carrion deposited by the tides. In the inland they can sometimes be seen in dozens around the yards where sheep or cattle are being slaughtered. Otherwise it soars high, singly or in pairs, keeping a sharp eye on the ground for the carcase of some wild animal. Whistling Kites also take a large number of rabbits, a few small reptiles, and insects.

The nest is a flattish structure of sticks lined with leaves. It occasionally will take over the deserted nest of another species. The nest is built in the horizontal branches of a tall tree or in a high fork, and the two or three red-spotted

white eggs may be laid at almost any time of the year.

The Fork-tailed Kite, *Milvus migrans*, is a bird found in many places between Europe and Australia. It is a common bird in the outback, hanging about homesteads and killing yards, where it is a very useful scavenger. Bush-fires also attract them, and they soar through the hot rising air, waiting for small creatures to run from cover as the fire advances.

Their normal range is northern and central Australia down to Point Cloates in the west and central N.S.W. in the east. There are spasmodic irruptions of these kites, when they penetrate much further south, often in hundreds.

Apart from scavenging, they feed on small mammals, reptiles and insects. These kites often appropriate the old nest of another species, re-lining it with wool or fur. They also build their own nests of sticks, thirty feet high and upwards in the fork of a tree. Nests have been found in Western Australia lined with cow dung. The same nest is often used year after year.

Two or three dull white eggs are laid. These are spotted and blotched with umber and reddish-brown and are usually laid about September in the south of its range, and May to July in the north.

The Square-tailed Kite, *Lophoictinia isura*, is not recorded from Tasmania and is rare in the coastal districts of south and south-eastern Australia. Seen in pairs, singly, or in flocks, this kite is not the homestead scavenger that the previous bird is, although they do forage in such places at times.

It may often be seen quartering open grass-country, rather like a harrier though faster flying. They favour country intersected with water-courses and breed in the timber growing along a creek. These birds are also common in some northern coastal areas, where they may be seen standing about on the beaches or flying up and down the edge of the sea looking for tit-bits. They appear to take the place of gulls in many such areas. Inland, these kites prey mainly on birds, often young ones taken from the nest.

Their own nest is large and built of sticks in a tree; old nests of other birds are also used. On a lining of leaves, the two white or sandy-white eggs are laid. These are boldly marked in reddish-brown and lavender and are laid about August.

Black-shouldered Kites, *Elanus notatus*, are delicate birds with diminutive beaks and short,relatively weak toes. The sexes are about the same size, which is unusual in birds of prey.

This kite is found throughout coastal Australia, rarely penetrating more than about 300 miles inland, although it is said to be a dry-country bird in Western Australia. They are subject to fluctuations of population and are also nomadic. Common on farmland, they may be seen hunting for mice, lizards, grasshoppers and other insects. It hovers frequently—almost as expertly as the kestrel, only being a

BROWN GOSHAWK

♀ 20 in.

*Immature*

GREY GOSHAWK

16½ in.

GREY GOSHAWK

*White Phase*

little more laboured when it does so.

The nest is a flattish bulky construction of sticks, lined with leaves and usually up in the umbrageous crown of a tall tree. Often the deserted nest of another species is utilised. The breeding season is usually from March to September and three or four reddish-blotched white eggs are laid.

At rest, the Letter-winged Kite, *E. scriptus*, is difficult to tell apart from the previous bird, although it is a more olive grey on the back than the silvery Black-shouldered Kite. Once on the wing the different pattern of the black markings is clearly apparent.

*E. scriptus* takes its name from the long black marking under each wing which resembles a W or an M when the wings are opened in flight. On the underwing of *E. notatus*, there is only a short black mark at the base of the outer flight feathers.

The Letter-winged Kite is mainly a bird of the inland, and is not as nomadic as its relative. Much of its hunting is done at night when it preys on various native rats. An irruption of such small animals will often be preyed upon by these kites, which congregate for the occasion.

They nest as a rule in tall trees, building at the ends of the branches. The nest is constructed of twigs and small branches and lined with leaves and animal fur. Three to six blue-white red-speckled eggs are laid at various seasons, depending on local conditions and food supply.

## CUCKOO-FALCONS

The Crested Hawk, *Aviceda subcristata*, is the only member of this genus found in Australia. This bird is also found in New Guinea and the surrounding islands. There are other species ranging through the south-east Asian islands and a widespread species in southern Africa.

Our bird has slight sexual dimorphism, the females being slightly browner on the throat and back. It is the only Australian hawk with a real crest, although the Osprey does have some rather attenuated crest-like feathers on the back of its head.

This bird's range is across northern and eastern Australia from the Fitzroy River in the north-west to central N.S.W. in the east. It occasionally penetrates down the coast to the vicinity of Sydney.

They are usually seen in pairs or even scattered groups, hunting along the edges of timber belts or along tree-fringed rivers.

Its flight amongst trees is silent and owl-like, on broad rounded wings. At other times it soars to great heights. It has the habit of indulging in aerobatics, tumbling like a pigeon and giving out a repeated double whistle described as 'wee-chou, wee-chou'. A mellow call, different from that of any other of our hawks.

They feed mainly upon insects caught around the tops of trees and taken from the foliage. They also eat lizards and small mammals.

The nest is a slightly cupped construction of sticks and twigs lined with leaves. It is built out on the thin twigs of a leafy branch, quite high off the ground. Three or four bluish-white eggs are laid about October or November.

## BUZZARD-KITE

This bird, known as the Black-breasted Buzzard, *Hamirostra melanosternon*, is a strange bird that has a genus all of its own. Physically it is more or less a kite, but much of its behaviour is buzzard-like. Its broad, deeply 'fingered' wings and the short rounded tail give this bird a silhouette very similar to a buzzard's, and yet its head and bill are most kite-like. Perhaps it could be called the Black-breasted Buzzard-kite —or even simply the Buzzard-kite.

It is found throughout most of inland Australia except the south and south-western parts of the continent. It is an open country species and is usually seen soaring high in the air. Otherwise these birds spend considerable time on the ground, seldom perching in trees except when visiting the nest. It builds in belts of timber bordering water-courses.

There are considerable plumage variations in this species, some being totally black on the breast and throat and others having this black broken up in various degrees by the rufus colouring of the underparts.

As it soars overhead it may at once be recognised by the large circular white patch on each wing at the base of the primaries. It is much more obvious in this species than in the Square-tailed Kite, the only other bird of prey with a similar marking. Also the rest of the primaries are dark in the Buzzard-Kite, while those of the Square-tailed Kite are barred.

The food of these birds is small reptiles, rabbits and other mammals. It also eats the eggs of emus and bustards, and is credited with the interesting habit of breaking the eggs with a stone, which is either held in its talons or dropped from the air. They build a large flat nest of sticks, lining it with leaves and placing it on the horizontal forks of a branch well above the ground. Sometimes, like many other Falconi formebirds, it uses the old nest of another bird.

The breeding season is from September to December and two white or buff eggs are laid which are richly blotched with lavender and reddish-purple.

## GOSHAWKS

These are long-tailed, short-winged forest hawks and the Brown Goshawk, *Accipiter fasciatus*, is a typical member of this genus.

This bird's main prey is small birds. These are taken in mid-air often after a dashing pursuit, twisting and turning through the trees. It also uses surprise tactics—bursting over the top of a hedge or clump of scrub to pounce amongst a flock of small birds feeding on the ground: young birds are also taken out of their nests.

Goshawks often hunt in pairs, especially when the

quarry is something as large as a rabbit. They harry it in turn until one of the pair manages to grip the rabbit by the skull in its enormously powerful talons. They also eat a few insects but will not touch carrion.

The female is much larger and more powerfully built than the male. Average weights being, male: 10–12 oz.; female: 18–23 oz.

The Goshawk is a great marauder amongst chicken runs, and will be extraordinarily bold on occasion to secure a prize. They can also be seen now and then in large city parks.

Females have a high-pitched chattering call that might be written as 'kek-kek-kek-kek', the males have a drawn-out plaintive 'wheet'.

A small, fairly flat nest of twigs is constructed, usually near the top of a tall tree. The female broods the eggs, only leaving the nest to be fed by her mate. Two to four eggs are laid which are whitish and speckled and smeared with red—not particularly heavily as a rule. The young birds are born with grey eyes and attain their yellow eyes at about three months. The Goshawk is distributed throughout Australia and Tasmania.

The Collared Sparrow- hawk, *A. cirrocephalus*, is very similar to the above bird. Indeed, in the field the large female of the Sparrow-hawk is almost impossible to tell apart from the small male of the Goshawk. Sparrow-hawks do have thinner legs and a very long thin middle toe, but they are wary birds and one seldom gets close enough to see such details.

They are distributed over most of the mainland and also Tasmania. Its habits are similar to those of the Brown Goshawk and it is a remarkably dashing bird in pursuit of its prey. They take smaller birds and young rabbits, and will sometimes raid chicken runs.

The Gos and the Sparrow-hawk are birds often used in falconry. They are both used in closely wooded country and fly from the fist after the quarry. Falcons on the other hand, are trained to 'wait on' overhead until game is flushed and are used in open country—giving the bird room for its power-diving 'stoop'.

SWAMP HARRIER 20 in

SPOTTED HARRIER 22 in.

Their distribution is Australia-wide and it is also fairly common in Tasmania. The call is a loud 'ke-yow' and a sharp chattering sound.

This hawk frequently makes it own nest of small sticks. It is not very large and usually placed in the thin top branches of a tall tree. Sometimes the old nest of another species is taken over.

The eggs are similar in colour to those of the Goshawk but smaller. They are laid on a nest-lining of green leaves, and the breeding season is normally September to December.

The Grey Goshawk, *A. novae-hollandiae*, is mainly a coastal and mountain area species but is also found in some inland forest areas. It is distributed across northern, eastern and south-eastern South Australia and also inhabits Tasmania.

This is a beautiful bird which has two colour-phases: pure white (sometimes with very faint grey barring on the breast), or pearly grey on the back and white below. The two phases inter-breed but the young are hatched as one or other colour-phase, and never as a cross. In Tasmania and South Australia only the white birds occur and it was from Bruny Island near Tasmania that the first bird described to science was taken.

CRESTED HAWK 19 in.

They are found singly or in pairs, frequenting densely timbered coastal ranges and other wooded country. They hunt in the goshawk manner, chasing small birds or ambushing them from thick cover. It will also raid chicken runs. The female can be as much as twice the weight of the male and weigh about 35 oz.

The females have been trained for falconry and found to have the same aptitude for it as the Brown Goshawk.

They build a large stick-nest high in a tree, lining it with leaves. The breeding season is from August to December and two, or rarely three, bluish-white eggs are laid.

The Red Goshawk, *Erythrotriorchis radiatus*, is in a genus of its own and is one of the least common and most locally distributed birds of prey in the world. It is confined to northern and eastern Australia from the Kimberlies in the north-west to central N.S.W.

This Goshawk has longer wings and a shorter tail than is typical of forest hawks, but does have the long accipiter middle toe of the 'bird-eaters'.

Unlike the Brown Goshawk and its kin, this species is said to feed on dead animals and "can be attracted from a great distance by a freshly killed animal" (Grossman and Hamlet). It circles high up in a buzzard-like fashion looking for its prey. Open, timbered country and the margins of swamps are its normal habitat where it hunts for birds, reptiles and small mammals. Quite large birds such as ducks, herons and cockatoos are on the list of its victims; it also raids nests for the fledglings.

The nest is a bulky structure of twigs and branches lined with leaves and placed near the top of a tall tree, often an ash or lemon-scented gum. There are usually two eggs which are bluish-white, sometimes faintly marked with pale red and lavender. The breeding season is from August to November.

## SWAMP HARRIERS

The Swamp Harrier, *Circus approximans*, is a common bird in many coastal and other districts. It is found round Australia generally except the inland and is also common in Tasmania.

Singly or often in pairs, it will be seen sailing at reed-top height on broad wings held in a shallow V, with widely separated primary ends.

It appears that it may be a spring-summer migrant to Tasmania. Its food is birds of the marshes, rabbits and small mammals.

It nests on the ground in rushes or a standing crop, building a bulky platform of reeds, sticks and herbage. Breeding season is September to January and three to five matte white eggs are laid.

Spotted Harriers, *C. assimilis*, are mainly inland birds. Their habits are similar to the other harrier except that, as a rule, they take over in arid country where the Swamp Harrier leaves off. Their feeding habits are also much the same except that birds are sometimes taken on the wing.

A large, loosely constructed nest is built of sticks with a plentiful lining of green leaves. It is usually placed in a thick, bushy tree. Breeding season is August to October and two or three whitish eggs are laid which soon become nest-stained.

## OSPREYS

Basically there is only one Osprey, *Pandion haliaetus*, found throughout the world, with slight variations of plumage in different localities.

Our bird is found along most of the coasts of Australia and Tasmania except the more settled parts. It also penetrates up large rivers and can be seen inland a good distance on suitable stretches of fresh water.

It is a fish eater, and catches them by diving down to the surface and snatching them in its talons: the captured fish is always carried off head first. The Osprey's feet are highly adapted to catching fish. The outer toe is reversible, there are spicules on the soles of the feet and the claws are very long and curved and of equal length.

They build enormous nests, adding to them year after year, until they are a number of feet deep. Usually these great constructions are placed on a rock-ledge overlooking the water, but occasionally may be in a tall tree. The nest is lined with seaweed or leaves and two or three whitish eggs are laid which are heavily blotched at the larger end with reddish-purple. The breeding season is from May to September.

## FALCONS

The Peregrine Falcon *Falco peregrinus*, is widely distributed in various parts of the world. There is but one species, with slight changes in size and coloration in different localities. The Peregrine is common in Australia and is found in Tasmania and throughout the mainland generally,except for Central Australia and western South Australia. Singly or in pairs they hunt over coastal cliffs, heavily timbered country and rugged mountainous terrain. These falcons are extremely fast fliers and their food consists mainly of birds taken on the wing. The Peregrine hunts by circling up above its quarry and then diving or 'stooping' upon it at high speed. The preyed-upon bird may be struck a lethal blow on the head by the hind-claw of the falcon, or the Peregrine may 'bind' to its quarry in mid-air. Their call is a loud oft-repeated 'ka-ka-ka', or 'kee-kee-kee'.

The breeding season is from August to November and the nest is usually made on a cliff-ledge, inland or by the sea. A hollow tree may also be utilized or the old nest of another species. Two or three buff eggs are laid, thickly marked with reddish brown speckles and blotches.

The Little Falcon, *F. longipennis*, is probably more common than the Peregrine and is also found in Tasmania and also widely on the mainland. It is not unusual to see this bird in cities, hunting small birds in public parks and even making the forays into suburban gardens. In the bush it frequents open, lightly timbered country and mountain ranges. This falcon's call note is a high, chattering 'chi-chi-chi'.

Its food is mainly small birds struck on the wing and often taken from below rather than being 'stooped' at from above. The old nest of other species is used and three buff-white eggs, heavily marked with reddish colours, are laid. The breeding season is September to December or later.

Brown Hawks, *Falco berigora*, which are better called Brown Falcons, are common birds in most parts of their range and may frequently be seen perched on telegraph poles or fence posts awaiting some suitable prey. They also hunt from the air, quartering open, lightly timbered country for small birds, reptiles, mice and large insects. They seldom build their own nests, but utilize the deserted one of another species. Two to four eggs are laid, which are usually covered with reddish freckles and blotches. Breeding season is June to November. Brown Falcons have two extreme colour phases with gradations between them, from dark vandyke browns with the underparts heavily marked, to light sandy browns with pale buff underparts lightly marked with brown.

The Kestrel, *F. cenchroides*, is a familiar bird to many country people and may also be seen in our cities, where it sometimes nests on tall buildings. It is found in Tasmania and the mainland generally, and in most places it is common. Kestrels are usually seen flying low, or hovering over

LITTLE EAGLE

♂ 18 in.

♀ 21 in.

WEDGE-TAILED EAGLE 38 in.

cultivated land, where they do a great deal of good by capturing mice, grasshoppers and other pests. The call is a delicate, high chatter.

They nest in a crevice or ledge on rock-faces or in a hollow limb of a tree; sometimes the deserted nest of such birds as crows may be used. Four or five eggs are laid which are buff with varying amounts of reddish markings. Breeding season is from August to November.

A much less common bird is the Grey Falcon, *F. hypoleucus* which inhabits the inland areas of Australia, extending its range to coastal districts in Western Australia except for the south-west forest country. It is not so dashing as the other Falcons and it is not a chicken-raider. Its food is small birds, reptiles and the smaller mammals. The call is a loud 'cluck-cluck-cluck'.

This Falcon may build its own stick nest high in a tree or appropriate an old nest. Two to four eggs are laid on a lining of soft bark, wool or hair. The eggs are buff-white and covered with spots and blotches of rusty red; breeding season is July to October.

The Black Falcon, *F. subniger*, is possibly our rarest Falcon. It is found through the inland areas of eastern and southern Australia, extending to coastal areas in a few places. It is notably rare in Western Australia. A very swift and powerful flier, it is said to have remarkable powers of endurance on the wing. It pursues quails and other birds of the open spaces, which it takes in the air like most falcons. The call is a subdued version of the Peregrine's, but is not often heard. In most cases the two to five buff eggs are laid in the deserted nest of a crow or magpie. The eggs are spotted reddish and purplish-brown; breeding is June to December but may vary according to availability of food.

# GALLIFORMES

## Fowl-Like Birds

The Galliformes are a large order, although not represented particularly strongly in Australia. There are about two hundred and forty species in the world, but only four are native to this country; there are also two introduced species, the Ring-necked Pheasant and the Californian Quail. The group derives its name from the Latin word for cockerel which is *Gallus*. All the members of this order share, in some degree, the characteristics of barnyard fowl. Most of the species are ground-birds (in some cases taking to trees only to roost) and are, typically, good runners. They mostly fly for only short distances and do not swim.

As the Galliformes are ground-birds, they have developed strong feet and legs with three toes before and one behind. The hind toe or hallux, does not touch the ground in most species.

The order is very widespread and, representatives of it are found on every continent except Antarctica. The Polynesian complex of islands also lacks any indiginous galliform birds, although feral domestic fowl are found on some islands. Galliformes are fairly ancient birds, and fossils from early Tertiary rocks show fowl-like birds well established and clearly differentiated from other groups.

Their relationships, as a group, are not clearly decided by taxonomists. However, most of the Galliformes are not highly specialized and they appear to be close to the basic types from which most birds developed in the Mesozoic Age.

Some of the species in this order were among the earliest —perhaps even the first—birds to be closely associated with man. Included in this order are the multitudinous varieties of domestic fowl; these are derived from various species of Jungle-fowl which are found across south-eastern Asia from India to Indo China and Java. These Jungle-fowl are included in the pheasant family, although they are not unlike typical barnyard fowl. It is thought that these birds were first domesticated by Bronze Age man, about 4,000 B.C., and that they were probably bred more for cock-fighting than for their meat and eggs.

None of the pheasants (nor the equally well-known turkeys) are indigenous to Australia, but the *Megapodes* or Mound-builders, which bear some resemblance to turkeys, are peculiar to the Australian and south-east Asian area. Three of the seven genera are found in this country and the rest range throughout the islands from Sumatra and the Nicobar group to as far east as Fiji and northwards to the Philippines.

The three Australian birds, each placed in a separate genus, are the Jungle-fowl, the Brush-turkey, and the Mallee-fowl.

Jungle-fowl are found across coastal northern Australia and down the coast to Yeppoon in Queensland. The Brush-turkey is confined to the east coast of the continent, from the latitude of the Hunter River in N.S.W. northwards to the tip of Cape York. The Mallee-fowl is the most widely distributed, being found, in suitable habitats, from central N.S.W. across southern Australia to the west coast. In the west it is absent only from the south-west forest country.

All these birds build mounds of varying sizes in which their eggs are laid and incubated, making them the only animals higher in the evolutionary scale than reptiles, that do not use their own bodies to incubate their eggs or young.

These incubator mounds are variously constructed of vegetable debris together with earth and sand. The temperature around the eggs is controlled with extraordinary precision by the birds, often to within two or three degrees for weeks at a time. Heat to incubate the eggs comes from the sun and also the decomposing vegetable matter which lies buried in the centre of the mound. This heat is varied by the bird digging out or piling up again, the various materials which make up the mound. There is a long incubation period and, when the eggs hatch, the chicks have to dig their way up to the surface of the mound.

The other representatives of the galliform order in Australia are the quails and an introduced pheasant. We have four native species of quail in three genera and one introduced bird in a fourth genus.

Most of our quails tend to be subtly coloured in broken patterns camouflaging them in their environment of grassy fields, crops, scrub and other ground-cover, although some, such as the King Quail, have developed richer colours.

The Brown Quail and the Swamp Quail, two very similar birds are in the genus *Synoicus*, the King Quail is on its own in *Excalfactoria* and the genus *Coturnix* has, in this country, but one member—the Stubble Quail.

Californian Quail, *Lophortyx californica*, which was introduced in 1864, seems fairly well (though locally) established, and has become an 'Australian' bird. These are all included in the family *Phasianidae* which also contains the partridges (of which we have none) and of course the pheasants, represented in Australia only by the introduced Ringed-necked Pheasant, *Phasianus colchicus*.

This handsome bird was introduced, presumably with some idea of developing it as a game-bird, as it has been in Britain. It is still found in a few localities but is not flourishing in the same embarrassing manner as some of the other birds brought out to remind people of 'The Old Country'. Alien species, such as the Starling and the House Sparrow, for example, have become considerable pests in many districts.

When the remnants of Magellan's expedition returned to Europe in 1521 one of the men, with the infelicitious name of Antonio Pigafetta, told of a bird he had seen in the Philippine Islands. He talked of a strange bird, about the size of a fowl, which buried its eggs in holes in the sandy beach.

This species, now named *Megapodius*, still haunts the Philippine beaches, but little is known of its habits other than what was reported by Antonio Pigafetta.

As time passed, and more travellers went out and returned safely, so more stories of these egg-burying birds were recounted in Europe. Often the tales became distorted and some very fanciful 'natural history' grew up around the *megapodes*. In the 17th century, a well travelled Italian gentleman named Careri, told a tale about these birds which reads like something from a mediaeval bestiary. He said that it was a sea-bird which laid forty or fifty eggs in holes dug in the beach. These pits, on being left covered with sand, would become as hot as furnaces. The hatching chicks escaped incineration only because the mother bird would run around the nest calling frantically. The chicks, excited and spurred on by their parent, would struggle vigorously and so break out of the pits.

With such stories being told, it is little wonder that naturalists became more and more sceptical, even to the point of doubting these birds' existence at all. They were, in fact, left out of works on natural history by writers of the 17th and 18th centuries.

Eventually Dr. John Latham 'officially' discovered the brush-turkey in Australia and the mound-builders were at least given credit for existence. Although even Latham, and other naturalists, were confused by this bird, and misled by its naked red-skinned head, they called it the New Holland Vulture.

It took the great Mr. Gould to sort out the bird finally, and, he and his collaborator, John Gilbert, came to the conclusion that the brush-turkey and the newly discovered mallee-fowl were part of a distinct order of birds.

The Mallee-fowl was named for science by Gould and called *Leipoa ocellata;* which translates rather charmingly into 'spotted egg-leaver'. Gould's vernacular name for the bird was native pheasant, and in some parts of Australia it is still known as the 'pheasant'. In Western Australia the bird is frequently known by its native name of 'gnow' and, in Victoria the name 'lowan' is often used.

Officially the checklist name is Mallee-fowl, and considering that its habitat is exclusively 'The Mallee', this seems an appropriate name.

The term 'mallee' is aboriginal for small trees (probably *Eucalyptus dumosa*), found in north-western Victoria. Now, the meaning of the word has been broadened and, is applied to various areas of low, rather dwarfed trees and scrub; areas having an annual rainfall of between five and fifteen inches.

## MOUND-BUILDERS

The Jungle-fowl, *Megapodius freycinet*, is found across coastal northern Australia from the Kimberleys to central coastal Queensland.

Although a mound-builder by definition, the nesting habits of this bird vary considerably. On Dunk Island (a place made famous by the beachcomber–naturalist E. J. Banfield) some of the Jungle-fowl lay their eggs in individual pits on the beach. The egg is covered with leaves and left to chance and, the warming sun. On the same island some of the birds do not even dig pits but lay their eggs in the rocks. A suitable crevice is found in a large flat rock and the Jungle-fowl deposits its egg there, afterwards sealing it in with leaves.

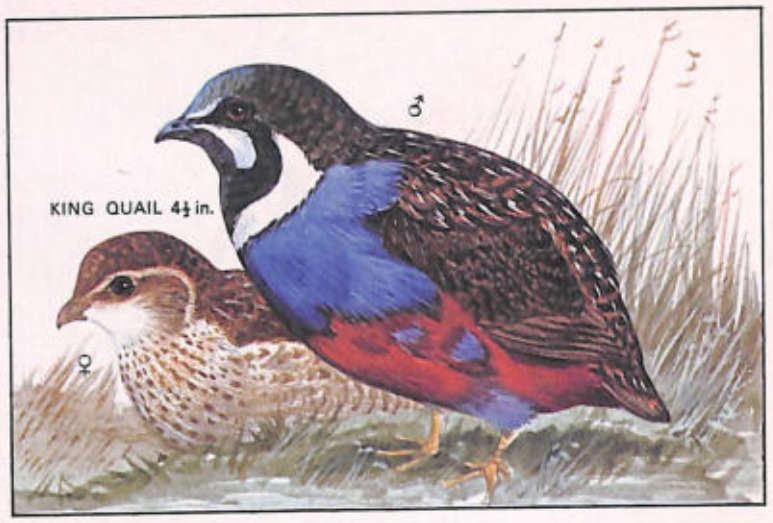
Yet another nesting variation of this bird, is the utilization of volcanic heat! On Savo, in the Solomon Islands, for example, there are two sandy areas through which volcanic steam filters. The Jungle-fowl come there in great numbers to lay their eggs. They dig a shallow hole and bury the egg where it is hatched by the steamy heat.

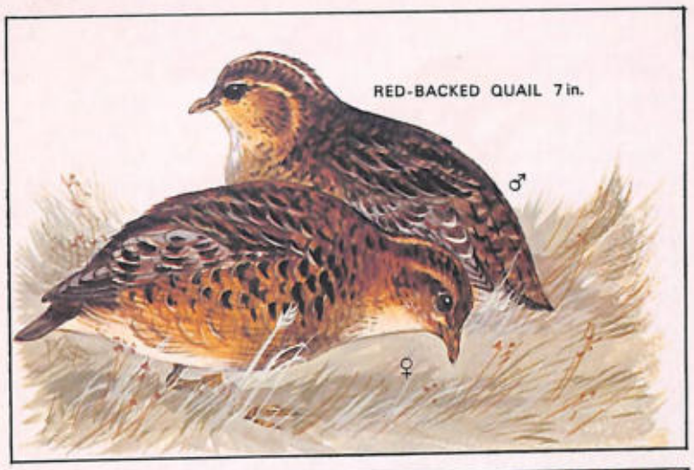
Oddly enough, Jungle-fowl are responsible for what are probably the largest structures built by any bird. Frith has recorded one mound sixty feet long, fifteen feet in width, and ten feet high. Early settlers thought that these massive piles of forest debris and earth must be native burial mounds. So the Jungle-fowl utilizes three kinds of heat: volcanic; the heat of the sun in exposed sites, such as the open beach; and in the more heavily shaded forest habitats, mounds are built and the eggs hatch in the heat of decaying vegetable matter.

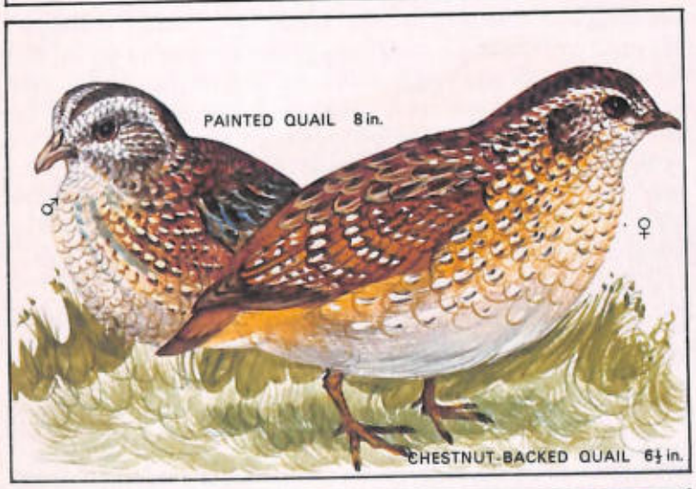
The birds feed on seeds, young shoots, native fruits and other plant-life. They are fairly shy and, if disturbed will usually depend on fleetness of foot for escape. If startled suddenly they may fly, flapping heavily off to land in the branches of some nearby tree. Their call is described as 'char-rooka' and a dawn call can also be heard which has been likened to the sounds made by a noisy typewriter.

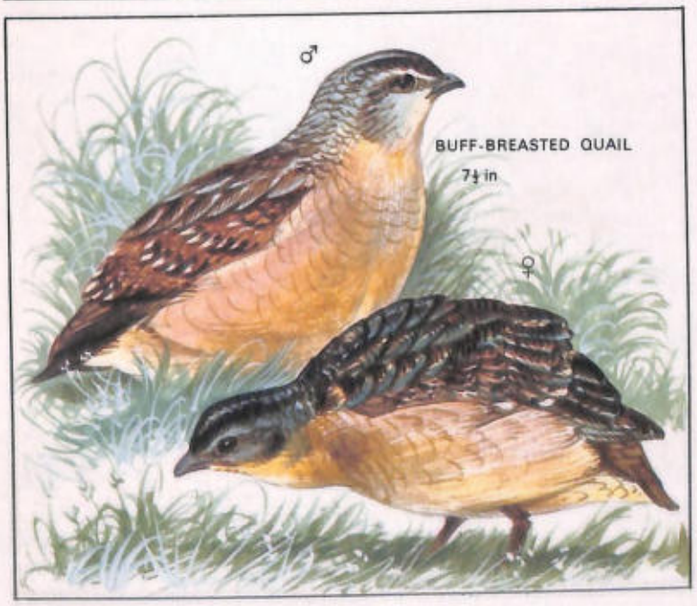
A large number of eggs are laid in a vertical position with the larger end upwards—thus, when the chick emerges it is facing in the right direction to struggle upwards to freedom.

Twelve to fifteen eggs are a usual clutch, but as many as thirty have been recorded. If a mound is built, each egg is laid in a separate tunnel, which may be eighteen inches to three feet deep. The eggs are a pale pinkish-brown when new-laid, but soon darken with the stain of the incubating materials. Jungle-fowl tend to breed from September to








December, but this varies with the suitability of the season.

Brush-turkeys, *Alectura lathami*, unlike the preceding bird, do not frequent open habitats such as beaches, but are confined to densely forested areas. Therefore, they depend entirely on the heat from fermentation within their mounds to incubate their eggs. The mounds are usually about twelve feet in diameter and three feet high. The rotting vegetable matter ferments very actively, causing a great deal of heat. The temperature of these piles of fermenting vegetable matter varies considerably: the fluctuations depend on the amount of moisture in the mound and the degree of aeration, thus the temperature may vary in different parts of the mound.

It seems that the Jungle-fowl lays its eggs in suitable temperatures by laying in different parts of the mound at various times. In the centre, the mound is 'dead'; on the surface the generation of heat has not started and, at a certain depth within the mound, is the level where the heat is just beginning to die away. It is into this last layer that the birds dig, to lay each egg. Thus, the older the egg, the deeper it will be buried.

The temperature is regulated by the male bird, which rakes about on the pile with its powerful feet, covering over cool sections and opening up parts that are growing too hot. Clouds of steam rise around the bird as he assiduously works on his responsible task. He only allows the female to lay her eggs when the first and hottest burst of fermentation is over.

These birds are rapid runners and when disturbed prefer to dash off into the jungle rather than fly. They do, however, roost in trees at night. They feed on wild fruits, seeds and insects. Their call is described as a single 'Wo' with the O-sound short.

Large clutches are laid, forty-eight were found in one mound, but eighteen to twenty or so is more normal. The eggs are laid, broad end up, at the end of tunnels eighteen inches to two feet deep. The white eggs soon become nest-stained. The breeding season varies according to local conditions, but August to September is typical.

The Mallee-fowl, *Leipoa ocellata*, is the best known of the Mound-builders, largely due to the excellent study of this bird by H. J. Frith, of the C.S.I.R.O. It is from Frith's studies of the Mallee-fowl that I have drawn much of the material for this section.

The Mallee-fowl is much more widely distributed than the other two Australian *Megapodes*, but in many places its environment is disappearing: threatened by encroaching agricultural development.

As with the other *Megapodes*, an incubation mound is built; the Mallee-fowl however, is faced with much greater problems of temperature control than the other two Australian Mound-builders. As with many arid, desert-like terrains, the mallee is subject to great fluctuations in temperature. Over the year this can drop to below freezing at night and above 100°F. during the day and, even during the summer the temperature can drop by 30° at night.

It will be seen therefore, that the Mallee-fowl cannot simply lay its eggs and desert them: constant attention by the bird is required if the eggs are to hatch.

The incubation mounds may vary in size considerably; about fifteen feet in diameter is a common size, although they may be up to eighteen. The smallest mound seen by Frith was four feet in diameter, and when heaped over with sand by the bird, was only two feet six inches high. Young birds build the smaller mounds, and these are increased in size each year as the bird works on them.

Apparently the younger birds, although inheriting an instinctive ability to build a mound, start off with no great

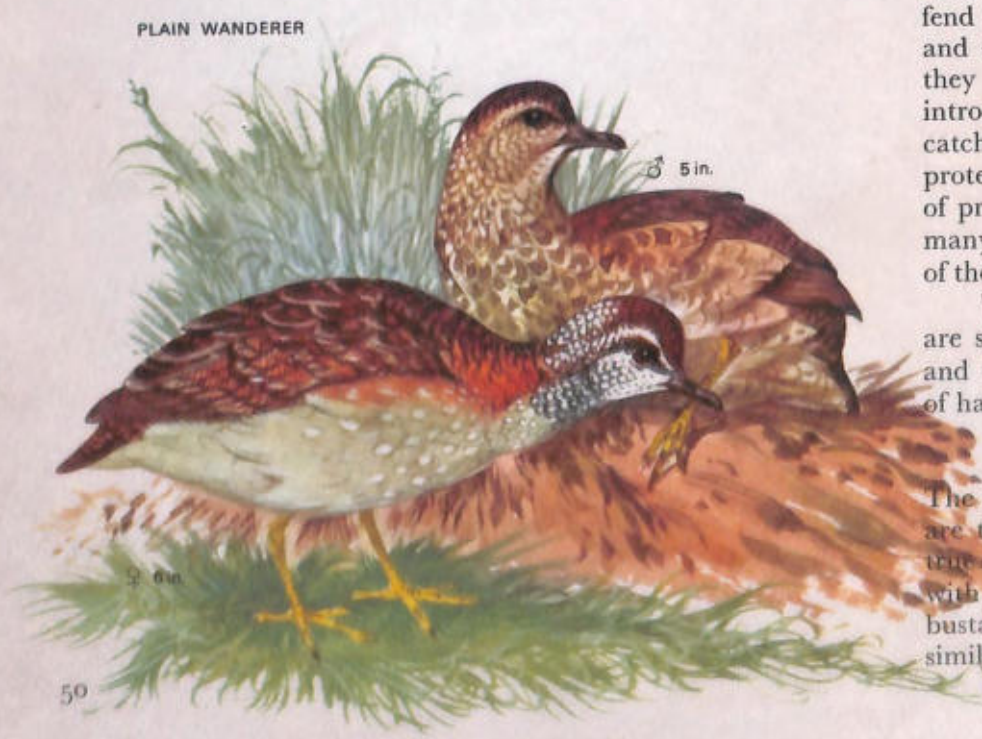
expertise in the matter. Each succeeding year shows an improvement of their technique and an increased efficiency in the mound as an incubator.

The Mallee-fowl does not gain maturity for two years; in the third it starts preparing a mound or renovating a disused one and in its fourth year it will breed.

Male birds fulfill practically all the duties of mound building and temperature control, the hen bird only joining in at the end when all the eggs are laid. Almost every day the male bird visits the mound, and indeed seldom strays far from it during the breeding season. Depending on whether the temperature in the mound requires raising or lowering, the bird acts accordingly. If fermentation is too rapid, a crater is opened in the top of the mound to let some heat escape. Should fermentation be slowing down, more sand might be heaped up to prevent loss of heat, or alternatively, the nest may be opened on a hot day to let the sun take over. The bird will even go to the length of spreading the sand in the hot sun so that it is all heated before being scraped back over the nesting chamber. Towards the end of the incubation period, when fermentation of the organic matter in the nest has ceased, the nest is opened up each day to let the sun finish the job begun by the fermentation.

At first sight the mallee appears to be a most inappropriate habitat for a bird requiring vegetable matter that pan be piled up to rot and ferment. The scrub of the mallee is not particularly umbrageous and, when it does fall, it dessicates and is blown away, eaten by termites or burnt in bush-fires. The ground remains almost bare, and the dry atmosphere prevails. The Mallee-fowl overcomes these apparent drawbacks by raking up the scanty material from large areas of fifty yards radius or more around the nest. The material is gathered during the winter when it is damp, and is buried immediately in the nest-hole. Then covered over with soil, it begins the process of fermentation.

It takes the male bird about four months of work to prepare the mound for eggs, and after an incubation period of six to seven months, during which time the male has to work at temperature control, there is not much of the year left. In fact, in some cases, there is no real break between the activities of one breeding season and the next.




The actual method used by the birds to determine the temperature of the mound has been a puzzle, but now it is known that the Mallee-fowl probes into the sand and vegetable matter with its open bill. Temperatures are kept astonishingly constant; one mound, in which continual temperature recordings were taken, was regulated to 92°F, with slight variations immediately being counteracted by the vigilant bird.

It is not unknown for the male and female to disagree over the desired temperature for the incubating eggs. Cases have been recorded in which one bird worked away at the centre of the open nest, flinging sand out with its powerful feet, whilst the other bird, with equal vigour, scratched sand down on top of its mate. The male bird always wins, being more persistent and more 'psychologically' attached to the mound; and if he feels that the temperature is not exactly right, will prevent the female from laying.

These remarkable birds are even credited with being able to forecast storms, and are said to build up the sand of their mounds in a steep slope, to shed the coming rain with greater effect.

Unlike the other *Megapodes*, the Mallee-fowl lays her eggs together in the one nest hollow. They are arranged in an upright position with the larger ends upwards.

The chicks are as fascinating as the adult birds. Their start in life is a difficult one; having broken their way out, the chicks have to dig their way upwards to the air and light through several feet of sand; this may take anything from two to fifteen hours. Some of the birds do not reach the surface, but become exhausted and eventually suffocate.

The amount and density of the sand obviously have a bearing on this, and in very hot weather, dead chicks are frequently found in the mounds. In such weather, the mound is built up for insulation against the sun and seldom opened, therefore it packs tight and imprisons all but the strongest chicks. Frith suggests that it is probable that the chicks retain their embryonic rate of breathing whilst still under the sand. There certainly would be little air for the bird to breathe, on its way up. It might be said, in this case, that the chicks are not strictly 'hatched' until they break out of the surface of the mound.

The successful escapee bursts from the sand, resting for a moment with only its head showing, before clambering out to tumble down the outside of the mound and totter to the shelter of a nearby bush. The young birds remain in shelter resting for the first day and then at dusk start to feed and fend for themselves. They live separately from each other, and are quite unattended by their parents. Fortunately, they appear to have no predatory enemies except the introduced fox. Field studies have shown that foxes actually catch very few, if any, of these birds, and they are well protected by the scrub and their own camouflage from birds of prey. What then keeps the population constant with so many chicks hatching every year? It seems likely that most of them must starve to death in their harsh dry environment.

The chicks of the Mallee-fowl and the other *Megapodes* are singular in having downy bodies but feathered wings, and they are able to fly within twenty-four hours or less, of hatching.

## QUAILS

The only other indigenous gallinaceous birds in this country are the Quails. Bustard-quails, which closely resemble the true quails are classified as Gruiformes—the next order dealt with in this book. They are placed with the rails, cranes, bustards and allied birds on grounds of anatomical similarities with the bustards and certain 'un-quail-like'

BLACK-BREASTED QUAIL 7½ in.

characteristics such as the lack of a hind toe or hallux as it is termed.

The genus *Coturnix* contains but one Australian species, the Stubble Quail, *Coturnix pectoralis*. This bird is found throughout the mainland except the tropical coastal areas. It also occurs in Tasmania where it is very rare.

The Stubble Quail was once much more common in Tasmania than it is today, and over the last ten years or so it has almost disappeared from this island. The exact causes of its decline are not known but, it is possibly a combination of such factors as modern methods of harvesting and the wider use of toxic pesticides. Domestic cats, which have gone wild, may also be accounting for numbers of these and other ground birds.

This quail frequents open plains country or any other well grassed locality, often visiting cultivated areas. Considerable flocks appear in good seasons, and it is nomadic in its habits, following the ripening of its seed-food.

Its common call is a loud 'Foo-weep', uttered singly, but repeated amongst the covey.

As a group, the quails tend to lay a large number of eggs, in contrast to the *Turnix* group (the bustard-quails) which typically lay a clutch of four.

The Stubble Quail lays seven or eight eggs which are buff-coloured and freckled all over with brown.

The breeding season is usually from September to January or February. The nest is a hollow on the ground, lined with grass and sheltered by a low bush or overhanging tussock: it is not uncommon for these quail to nest in standing crops.

The King Quail, *Excalfactoria chinensis*, is found, where suitable habitats exist, throughout northern, eastern and southern Australia as far west as Adelaide.

These handsome birds are usually observed in coveys although it has not been recorded as gathering in such numbers as the two preceding species.

Swampy lowlands are the bird's most common habitat, where they hunt for seeds of grasses and various other plants; they also feed on insects.

The call note is a mournful one which may be heard at intervals all through the night, and at dawn. These birds are chiefly nomadic in southern Australia, following the ripening seeds.

This quail builds a typical nest of the group—a few grasses lining a hollow under a tussock or bush. Contrary to the usual large clutch which is typical of the group, the King Quail lays only four eggs. These eggs are pale brown and are heavily speckled with darker brown and blackish markings. The breeding season is usually from September to March.

The next two quail are in the same genus and are very similar to each other in appearance.

The Brown Quail, *Synoicus australis*, is the smaller of the two and is usually found in a different habitat. This bird's range extends across northern and down eastern Australia, to Tasmania. It is probably less common in South and Western Australia.

These quail move in small coveys or larger flocks, and inhabit a variety of localities. They may be found in low-lying grassy country but they are reported, in Tasmania in particular, to be birds of the scrub and light forest.

BRUSH-TURKEY 24 in.

It is nomadic and its movements are governed by the availability of ripening seeds in different localities. The call of this bird is a loud double whistle variously described as 'Tu-whee' and 'Be-quick'. It is vociferous during darkness and at daybreak. Family parties, including young chicks, can sometimes be seen dusting themselves on quiet tracks or roadsides. If disturbed, they scatter in all directions to crouch in cover, making it difficult for any predator to find more than one or two.

The nest is a depression under a tussock or in rushes and lined with dried grass. About ten eggs are laid and these are dull white or bluish-white and are usually freckled with light olive brown.

As the vernacular name suggests, the Swamp Quail, *S. ypsilophorus*, is a bird of wetter habitats than its relative. Its range is south-eastern Australia and Tasmania, where it will be found in swampy areas and the fringes of marshes—usually about coastal districts. The birds' specific name derives from the Greek letter *ipsilon*, as the markings on the backs of these quail rather resemble this letter.

The call is similar to that of the Brown Quail, but deeper. These birds feed on seeding grasses and other plants, and also take insects.

November to February, or later, depending on local conditions, are the breeding months and the nest is similar to the Brown Quail's. Six to twelve yellowish-white eggs are laid which have spots of greenish-brown.

# GRUIFORMES

## Cranes, Rails and Allied Birds

This is a diversified order, containing such apparently unrelated species as the Brolga—a tall, graceful crane—and small, stumpy birds such as the Bustard-quails.

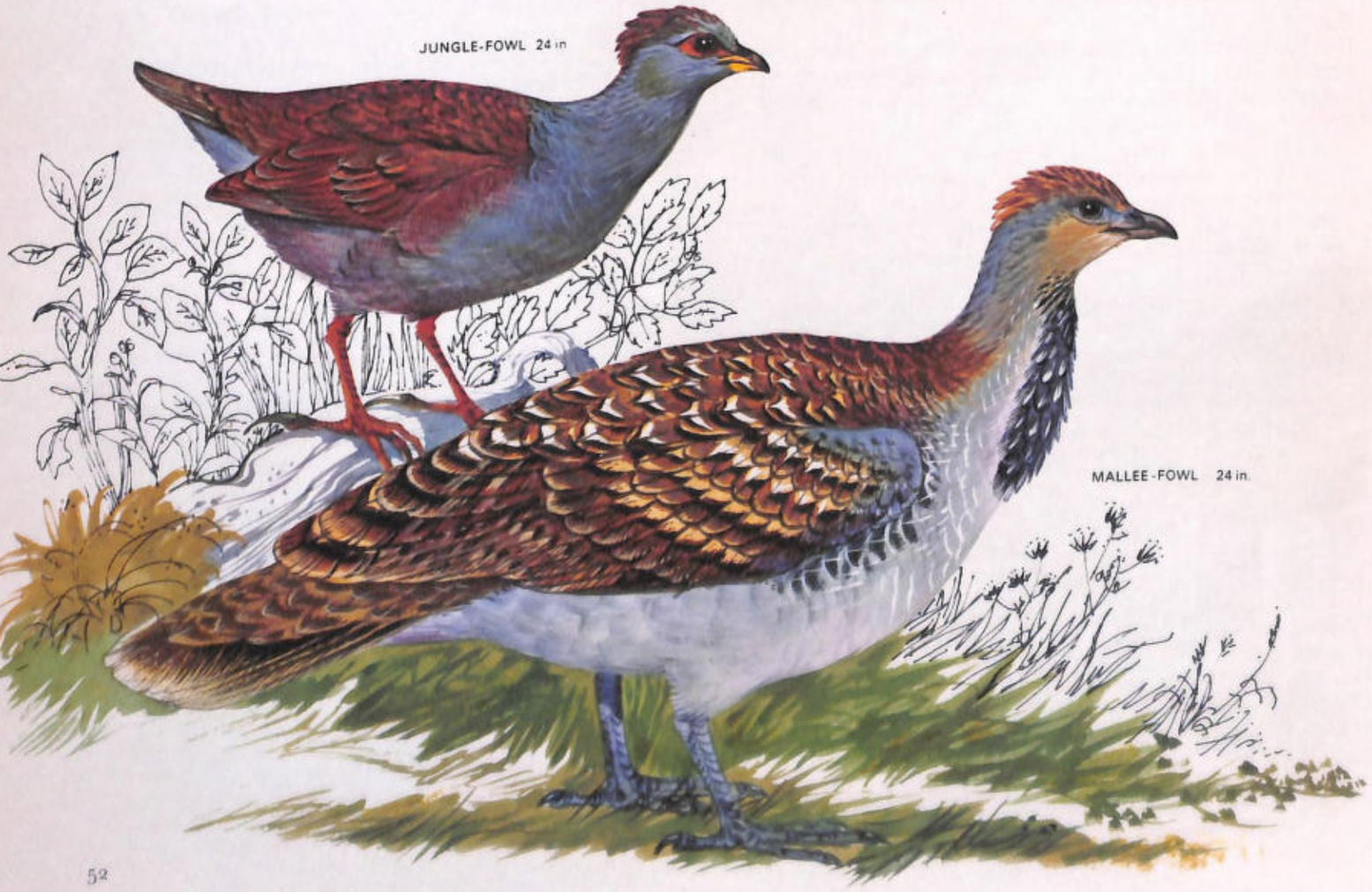
As a group, this order has no very near relatives, despite superficial resemblances to birds in other orders. Their closest relationships seem to be, in some cases, with the Galliformes, and in other species with the Charadriiformes —so they are placed between the two.

It is an ancient order, with fossil remains in early Tertiary deposits and it also seems that, as a group, they are declining. There is a higher percentage in the order of forms recently extinct or on the verge of extinction, than any other major order of birds.

On the whole, they tend to be more or less aquatic or marsh-loving and this is particularly true of the Australian representatives of the order.

We have twenty-five species on the check list divided amongst fourteen genera, but two species, the Malay Banded Crake, *Rallina fasciata*, and the Corncrake, *Crex crex*, have only been recorded in Australia once and twice respectively, so are not dealt with in the body of the text.

Bustard-quails, in the family *Turnicidae*, would seem, superficially, to belong with the quails in Galliformes, but anatomically they must be placed nearer the bustards and their habits, also, are more bustard-like than quail-like. They lack the hind toe of the quails and lay considerably fewer eggs. The Plain Wanderer is considered to be an aberrant species which *does* have a hind toe and lays only four eggs which are strongly pointed rather than oval.



The next bird in this order is in the family *Gruidae*, and is Australia's only crane—the Brolga, *Grus rubicunda*, not to be confused with the White-faced Heron, which is often called 'the blue crane' by country people. Brolgas are beautiful birds that gather in small flocks out of the breeding season and often indulge in community dances. They weave intricate patterns of steps, interspersed with bowing and jumping, which altogether makes a remarkable sight.

The family *Rallidae* contains the rails, crakes, and waterhens. There are four rails and four crakes in this country. The terms 'rail' and 'crake' are not particularly exact or definitive, although 'rail' is usually applied to the longer billed birds and 'crake' to those with a shorter, more conical, bill.

These birds are marsh- and swamp-frequenting species, and are often active and vociferous at night, their rather harsh voices adding to the mysterious atmosphere of their wild haunts. Their long legs and attenuated toes are highly suitable for wading and walking over mud, and their narrow bodies are also an adaptation which allows them to run rapidly through the thick reeds and other swamp-growth.

There are five species of 'waterhens' in this country, and a coot. The Black-tailed Native Hen is distributed throughout most of Australia and the Tasmanian Native Hen is confined to that island.

There are two species of Swamphen—one found in the west of Australia and the other throughout most of the continent except the south-west. These are beautifully coloured birds, tinted with deep shining blues and purples.

A bird of similar shape and size is the Dusky Moorhen, but this species lacks the deep colouring of the swamphens; it is dusky-brown and grey with a less developed red shield on the forehead.

The ubiquitous Coot is too well known to require much description. They have taken readily to living in man-made ponds and lakes and may be seen in our city gardens as well as in the wild. In the winter they sometimes congregate in considerable numbers on large stretches of water, such as estuaries and lakes.

The Bustard, *Eupodotis australis*, is one of our largest land birds that has the power of flight. It is becoming increasingly rare and is found now only on the more undisturbed of our outback grass-plains. It was once common all over Australia, but persecution by hunters and the advance of civilisation have drastically reduced its numbers. There is a current plan in operation by the Fisheries and Wildlife Department of Victoria to try and re-establish the Bustard as a breeding species in this State.

## BUSTARD-QUAILS

These birds, although so similar in appearance to the true quails are, however, classified with the Gruiformes on points of internal structure, the lack of hind toe and, to some extent, their habits. For convenience in field identification they are illustrated with the quails.

Black-breasted Quails, *Turnix melanogaster*, inhabit the thick scrubs of south-eastern Queensland. They are very rare, and seldom observed, as they do not venture out into open country.

Little is known of their habits, but their food is no doubt various seeds and insects. The nest is a depression sheltered by a low bush or a tussock. This hollow is lined with grasses upon which the three or four eggs are laid; these are a pale buffy-white, freckled with browns, lavender, and spots of black. February to April is the presumed breeding season.

The Painted Quail, *T. varia*, is a more common bird with a more extensive range. It is found from central coastal Queensland to Victoria and south-eastern South Australia; Painted Quail also occur in south-western Australia. It is also recorded for Tasmania, where it is said to be unevenly distributed.

Its typical habitats are open forest, heathy uplands and the timbered ranges of foothills.

This quail is often active at night, when its booming note is heard, reminiscent of a Bronzewing Pigeon's call. The female is larger than the male, and it is she who takes the initiative in the courtship activities. Having won the attentions of a male, she then leaves the *brooding* of the eggs and the raising of the young birds to him. One female may have a number of mates, all sitting on eggs in various nests that she has constructed. The booming note is made by the female to attract suitors. When a male bird arrives on the scene, she indulges in a display—circling around him with tail erect and chest puffed out. She stops frequently to stamp her feet, scratch at the ground, and boom at the male bird.

These birds show a predilection for insects, and in captivity, will take moths, grasshoppers, and so forth from the fingers. They also eat the seeds of grasses and other plants.

The nest is a shallow, saucer-depression lined with grasses and often hooded by the grass blades growing overhead. Nests have been found with eggs in almost every month of the year, but the height of the breeding season is usually late summer and autumn, depending on the seeding time of grasses.

Four eggs are a normal clutch, and these are buff to greyish-white, heavily marked with chestnut-brown, violet and slate-grey.

The Chestnut-backed Quail, *T. castanota*, is a bird of the far north, being found from the Kimberleys to Arnhem Land. Sandstone country is a typical habitat, where it may be seen in coveys. They seldom fly but run for cover when disturbed. If flushed, they rapidly fly a short distance and return to the ground.

Again the female is larger than the male and may possibly take the lead in courtship.

The four greenish-white eggs are spotted with brown and are laid in a depression lined with grass. The nest is either under or in a tussock, and often in the vicinity of water. The breeding season is from January to March.

Buff-breasted Quails, *T. olivii*, are even more localised birds, being found only in Central and Western Cape York Peninsula.

The female is larger than the male and the birds move in pairs or small coveys, inhabiting the grassy clearings in open forest country. They are shy birds, and very little is known of their life history. They feed on seeds, and fine gravel is said to be swallowed as an aid to digestion.

The nest is an oval construction of grass with a hole in the side, and is usually placed under a tussock. The breeding season is usually late summer and early autumn, and four whitish eggs are laid; these are speckled with grey, reddish-brown and black.

Little Quails, *T. velox*, are nomadic birds and are usually seen in coveys. Their appearance is related to rainfall and in a good season, when seeds and insects are plentiful, large numbers sometimes appear. This quail is found throughout Australia generally, except for coastal northern and eastern districts. The birds are difficult to flush and, when surprised, a covey will fly off for a short distance in different directions and is hard to put up a second time.

Again, the female is larger than the male and, having courted a mate, leaves him to the domestic duties.

The nest is a slight depression in the ground and is

BROLGA 42 in.

lined with a few grasses and concealed under a tussock. Four buff-white eggs are laid and these are thickly marked with slate-grey, chestnut and purplish-brown. The height of the breeding season is September to December, but birds may be found nesting at almost any time.

The Red-chested Quail, *T. pyrrhothorax*, is distributed across northern, central and eastern Australia, except west of the Dividing Range; it is also found in Victoria and south-eastern South Australia.

Travelling in pairs or small coveys, this quail is nomadic in its habits: grasslands, river flats and high, more arid country, appear to be equally favoured.

The nest is simply a hollow, scantily lined with grass, and concealed under a bush or grass-clump. Four eggs are laid, buffy-white, spotted with slate-grey, chestnut and dark brown. The breeding season is usually from September to December.

Red-backed Quails, *T. maculosa*, are northern and eastern Australian birds. They have been recorded occasionally from northern Victoria. These quail are very shy birds, lying close in cover when disturbed, and seldom taking to the air. Their habitat is usually marshy country with low scrub cover.

The nest is typical—a grass-lined scrape under a bit of cover, and the four eggs are greyish-white to stone-grey, heavily freckled with pale browns and greys. The breeding season is from October to February.

The Plain Wanderer, *Pedionomus torquatus*, is an eastern Australian bird, and it ranges from southern South Australia through Victoria and N.S.W. and probably as far north as central Queensland. It is considered to be a somewhat aberrant species of Bustard-quail.

Before the days of increasing settlement and agriculture on our inland grass plains, this interesting little bird was quite common, but nowadays is becoming increasingly rare.

Plain Wanderers do not travel in flocks or coveys, but may be seen in pairs. They fly only under extreme provocation, preferring to run on their relatively long legs and hide in the grass. As they move about, these birds have the curious habit of raising themselves 'on tip-toe' to peer over the tops of the tall grass in which they feed. Their diet is made up of the seeds of various grasses and other small plants; they also take insects.

The nest is a grass-lined depression in the ground and it is usually sheltered or hidden under drooping grass or a low bush. Four eggs are a common clutch and these are stone-coloured or yellowish-white, thickly freckled and marked with various tones of umber and slaty-grey.

The breeding season is from September to January or February, but possibly varies with differing seasons.

## CRANES

The Brolga, *Grus rubicunda*, is our only crane and, although it is not as common as it used to be, it can still be seen in considerable numbers in certain places. Small flocks regularly visit the Western District of Victoria each winter and they also congregate on the inland grass plains of N.S.W. and Queensland. They are distributed throughout Australia except Western Australia south of Onslow, and coastal south-eastern Australia.

Brolgas have, like most cranes, loud, trumpeting calls that can be heard over a mile away in open country. A trumpeting bird looks most dramatic—almost heraldic—as it arches its folded wings and droops its wingtips to the ground. The long neck is curved back and the bill points to the sky whilst the bird quivers all over with the exertion of the raucous cry. Their trachea, or windpipe, is greatly developed, being long and convoluted, and acts as a very effective trumpet. They have a variety of mellower, fluting calls, which are more intimate, and used as the feeding birds communicate with each other.

In some localities Brolgas appear to be permanent residents, nesting and wintering within a few square miles. Others are nomadic, although not a great deal is known of their movements. They fly high when on the move, and cranes in other countries have been reported as flying as high as two miles.

The dancing habits of the Brolgas are well known, although not many people have seen them indulging in these 'quadrilles and minuets'. Any number, from a pair up to a dozen or so birds, will line up, roughly opposite each other, and start the dance. They prance forward on their stilt-like legs with wings half-open and shaking. Bowing and bobbing their heads, they advance and retire, gurgling and fluting softly. Now and then a bird will stop and, throwing back its head, trumpet wildly. The birds may also leap into the air a few feet and parachute back to earth on broad black and grey wings. Pieces of twig or grass are flung about and the Brolgas make attempts to catch the pieces or stab at them with their bills as they fall.

Various aborigine tribes have incorporated these Brolga-dances into their corroborees, and they imitate the angular, though graceful, birds with great skill.

The dancing of these cranes may be used in courtship

display, but they certainly indulge in it outside the breeding season. It seems then, that the birds are often expressing a sense of 'playful exuberance' and a release of energy, rather than anything more functional such as a sexual display.

Brolgas become tame quite readily, and country properties often have a bird that comes to the homestead and can be fed from the hand.

Their diet in the wild is insects and small animals such as frogs, reptiles and rodents. They also eat a certain amount of vegetable matter, and occasionally will damage grain crops.

Brolgas nest in a variety of situations. Sometimes the eggs may be laid on the bare ground, or alternatively a few pieces of grass or reeds may be placed around the eggs. They also nest in wet, swampy spots, in which case the nest will be a more bulky structure of reeds and other plants, and it may even be floating.

Two eggs are the common clutch; sometimes one is laid, and more rarely three. They are a dull whitish colour, minutely pitted, and lightly freckled reddish. The breeding season is from September to March as a rule.

## RAILS AND CRAKES

The Chestnut Rail, *Eulabeornis castaneoventris*, is a shy bird of the marshes and swamps of coastal northern Australia. It ranges from the Kimberley area to Cape York. It is usually found in mangroves or along muddy tidal flats and shores. These rails rely on fleetness of foot to escape from danger, seldom taking to the wing, consequently they are rarely seen. They feed on insects and crustaceans and build a flat, stick-nest on the low branch of a mangrove. The breeding season is from September to November and four pinkish-white, chestnut-spotted eggs are laid.

In the genus *Porzana* we have three crakes. The Spotted Crake, *Porzana fluminea*, is found in eastern and south-eastern Australia, South Australia as far up as Lake Frome, and south-western Australia. It also inhabits Tasmania, where it is regarded as common.

The cautious observer may see these crakes as they step slowly, flicking their tails, through the reeds and sedges. This bird is known to swim more than some of the other crakes. Although normally shy, if not interfered with, they may come to disregard human activities to some extent.

Fresh shoots of aquatic vegetation and insects are eaten, and the bird's call is described by Sharland as 'metallic'.

An open nest is constructed in the base of a tussock growing in water. The breeding season is from August to January and the four or five stone-brown eggs are marked with shades of brown and grey.

The Spotless Crake, *P. tabuenis*, is an inconspicuous bird, coloured greyish-brown and merging perfectly with its surroundings. They are found in eastern and south-eastern Australia across to eastern South Australia. They also occur in south-western Australia and Tasmania, where they are common.

BANDED RAIL 10½ in.

BUSH-HEN 8½ in.

These crakes haunt the reedy edges of streams and swamps. If seriously startled they will fly off to some nearby clump of reeds, often trailing their long legs on the water. Their call note is recorded as 'creek-crek'.

The nest and eggs are well camouflaged and are placed in a grass or reed clump. It is said that these birds will remove their eggs if the nest is disturbed. From four to seven eggs are laid, and these are pale creamy-brown, with faint markings of chestnut. The breeding season is from September to January.

The Marsh Crake, *P. pusilla*, is found throughout most of the coastal belt of Australia although it has rarely been recorded from the North. It is also fairly common in Tasmania. More often heard than seen, this wary bird has a number of calls. The chief call is a 'krek' or 'crake', from which these birds derive their name; the bird also calls 'whee-whee-whee' followed by a harsh 'chur'.

Marsh Crakes feed on aquatic insects and plants and small molluscs. They swim and dive well, but usually feed as they wade in shallow water.

COOT 14 in.

The nest is a slightly cupped platform of grasses and other plants built in a clump of reeds or bush growing in the water. Five or six pale brown eggs are laid, which are tinged with olive-brown and some have slightly darker streaks. They breed from October to January.

The Lewin Water Rail, *Rallus pectoralis*, is distributed throughout the coastal areas of south-eastern and eastern Australia. It is rare in south-western Australia, but is found on Kangaroo Island and in Tasmania, where it is also uncommon. Its haunts and habits are similar to those of the preceding species. It rarely flies but its voice, a metallic 'clink' and a grunt, may be heard in the reed beds. When alarmed, it makes a 'tick-tick-tick' call.

The nest is similar to the other rails and crakes, and the three to five eggs are creamy-white covered with purple-brown marking. The breeding season is from August to December.

The Red-necked Rail, *Rallina tricolor*, is a marsh bird confined to Northern Australia around the coastal areas of Cape York Peninsula. It frequents dense cover along the margins of water, and may also be seen foraging up the sides of stony ridges. Like most of this group, it is a shy bird and difficult to approach. It skulks off into thick cover if disturbed, but its loud call may give its presence away. This is described as 'gurk' and also 'clock-clock' repeated a number of times. It also has 'curious grunting notes' which are most often heard at dusk or at night.

They lay their eggs in a hole scratched out in the ground. The nest is lined with a few dead leaves and three to five white eggs are laid. The breeding season is from January to April.

The White-browed Crake, *Poliolimnas cinereus*, is a northern Australian bird found along the coastal marshes from the Kimberley area in Western Australia to northern Queensland. It is also native to Malaysia and various other islands to the north of our continent. As mangrove swamps are common along our northern coastline, these crakes are usually found in them, but they also frequent fresh water marshes and other wet places further inland.

They hunt along the muddy flats, looking for the mud-worms, insects and aquatic plants that are their food. The White-browed Crake is also adept in trees, where it may be seen climbing with ease amongst the branches.

The nest is built of coarse grasses and lined with finer stems. It is placed on the ground in cover or in a swamp-surrounded tussock. Three to six greenish-white eggs are laid with 'fleecy markings' of reddish- or yellowish-brown. The breeding season is usually from January to April, but may be later in some areas, probably depending on local rainfall and the state of the swamps.

Banded Rails, *Hypotaenidia philippensis*, are found around the southern perimeter of the continent from North-West Cape in Western Australia to Tasmania. It appears to be a bird of the coastal areas as it has not been recorded from any great distance inland. Single birds or pairs may be found in swampy areas generally, along the margins of streams and fossicking in cultivated paddocks.

It is abroad at dusk or late in the day but usually remains hidden during the brighter hours. In Western Australia it is recorded as visiting off-shore islands such as the Abrolhos Islands and the Recherche Archipelago.

This bird, like the other crakes and rails, flies but rarely, but runs swiftly into cover when disturbed. Its alarm note is a sharp 'kek' which is often taken up by other rails in the vicinity. Another call recorded is 'jik-jik'.

It feeds on the fresh shoots of various plants, seeds,

insects and small fresh water molluscs. The nest is a saucer-shaped construction of dry grass and other plants, hidden in a tussock or other rank growth.

October to January is the breeding season and up to eleven, but more usually five or six, eggs are laid. These are a creamy-buff, speckled and blotched with brown, purplish-red and grey.

The Bush Hen, *Amaurornis ruficrissus*, is a rail of the far north, being found along the coastal areas from the Northern Territory to eastern Queensland. They do not appear to venture far inland but may be seen haunting reed beds and other typical rail habitats. Not a great deal is known of their habits, but they are probably much the same as those of their relatives.

The nest is also a typical rail's nest and the four to six creamy-white eggs are freckled with purplish-red and grey. They breed from October to March.

## WATERHENS

The Waterhens are included in the same family as the crakes and rails, although they do not look very similar.

The Black-tailed Native Hen, *Tribonyx ventralis*, is distributed throughout Australia except for the northern and south-eastern coastal districts. It is also absent from Tasmania.

This is a nomadic bird and sometimes large irruptions occur, where before there were but a few birds. These influxes of birds appear to be related to rain (and the consequent increase in food supply). As the swamps dry out the birds disappear as rapidly as they came.

From Western Australia, Gould had an account sent to him of these birds " . . . . invading the settlers' fields and gardens in the month of May 1883 in amazing numbers; it had not been seen before, and has hardly been seen since".

There have been many other reports of these birds flocking to certain localities and often damaging the crops. They look lively birds, strutting along amongst the reeds or out in grassy fields. They flick their tails as they walk and if disturbed can run very rapidly: they fly only on great provocation.

They feed on grass and other plants and small aquatic life. The nest is placed deep in the rushes or under the shelter of a low bush or tussock. The breeding season is from August to December and five to nine light green eggs are laid, spotted sparsely with brown and violet-grey.

The Tasmanian Native Hen, *T. mortierii*, is confined to Tasmania, where it frequents the margins of streams and swamps. It is very common but somewhat shy, although it can be seen wandering out in open paddocks in quiet places. This bird occurs at considerable altitudes, being found, for example, in the Cradle Mountain area at 3,000 feet.

It is presumed to be flightless (it will not take to the air even if pursued by a dog), yet it occurs on Maria and Flinders Islands. Its speed has been timed at 30 m.p.h., which is faster than some small birds fly. The call resembles the sound of steel being sharpened; it also 'clucks'.

The nest is a deep and bulky construction of rushes, plant stems and other herbage placed on the ground under a thick bush or in a clump of reeds. Five to eight yellowish to buff-brown eggs are laid, spotted and blotched with browns. The nesting season starts about July with great swabbling amongst the flocks.

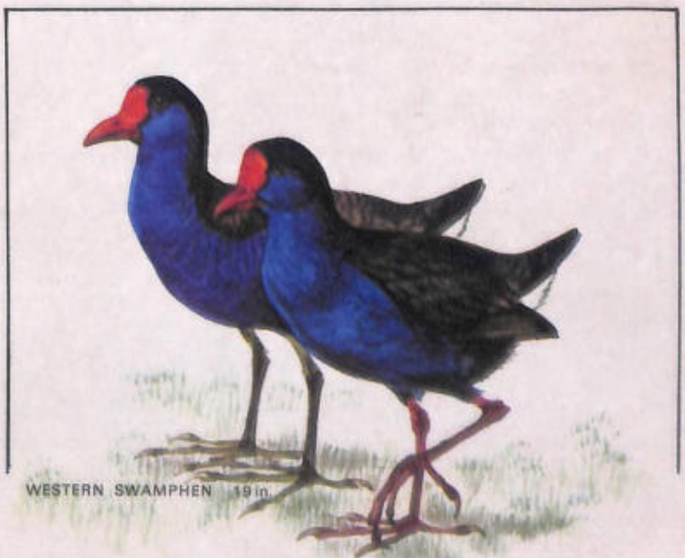
The Dusky Moorhen, *Gallinula tenebrosa*, is found in eastern and south-eastern Australia to southern South Australia. It also inhabits south-west Australia and the main islands of Bass Strait.

It is similar in its haunts and habits to the other water-

BLACK-TAILED NATIVE HEN 15 in.

TASMANIAN NATIVE HEN 20 in.

DUSKY MOORHEN 15 in.


WESTERN SWAMPHEN 19 in.

EASTERN SWAMPHEN 17½ in.

hens except that it probably swims and dives more than the others. If sufficiently disturbed, it will take off in laboured flight.

In some cities it is a frequenter of park lakes, and is not as shy as the swamphens. Out of the breeding season the Moorhen does not congregate in flocks like the coot and the other waterhens.

The nest is typical of the group. Five to seven eggs are a normal clutch, but as many as twenty have been recorded when more than one female lays in a nest. The eggs are creamy-white, with spots and blotches of brown. The breeding season is from August to December.

Eastern Swamphens, *Porphyrio melanotus*, are found throughout most of the continent, wherever suitable stretches of water or marsh allow. They are also in Tasmania and on other islands. The eastern form of this bird, *melanotus*, is not found in Western Australia south of the Fortescue River. There is, then, a gap before the western form, *porphyrio*, takes over in the south-west corner, from Moora to Esperance.

The Eastern Swamphen sometimes gathers in large flocks, outside the breeding season, and will invade gardens and crops where they can do a great deal of damage. Their normal haunts are stretches of water with enough cover for them to hide and nest in, or the sedgy banks of streams and swamps.

The call is loud and strident, but hard to put into words. It is heard a good deal at night but the bird will cry out at any time if alarmed. It swims easily and climbs trees readily, often roosting in their branches at night. Swamphens continuously flick their tails as they walk, and can run with great speed.

Their food is grass and other herbage plus fresh water molluscs and insects.

Nests are usually built just above the water on trampled-down reeds or in a tussock. Five to seven pale, creamy-brown eggs are laid, spotted with darker brown and grey. The breeding season is from August to January.

The Western Swamphen, *P. porphyrio*, is confined to the south-west corner of the continent. This swamphen has the interesting habit of constructing platforms, rather similar to its nest, which it uses as feeding spots. Traces of mollusc shells can usually be found on such platforms. The eastern bird may also build these platforms although I can find no record of it.

The Western Swamphen is a shyer bird than its relative and seldom ventures from cover unless it thinks that it is unobserved.

Nesting habits are usually similar to those of *melanotus*, but the eggs tend to vary in size and clutch number: as a rule, the smaller the clutch, the larger the eggs. As well as nesting in reeds this bird will also build a nest of sticks and rushes on a branch over the water.

Two to five or six eggs are laid and these are a light sandy-brown with freckles and spots of browns and purple. The breeding season is from July to November or December.

The Coot, *Fulica atra*, is found throughout the continent generally and also in Tasmania. It is a common bird in most of its haunts although the numbers sometimes vary considerably.

It is an expert swimmer and diver and has toes unique in this order of birds. Each toe is broadly lobed (rather like those of a grebe) which gives much more thrust than a waterhen's foot, when the coot is swimming and diving. Coots swim in a distinctive manner, working their heads back and forth and jerking along rather like a clock-work toy.

They are noisy birds and have a variety of high raucous calls, often heard at night.

There appears to be a fairly regular migration between Tasmania and the mainland, as large numbers sometimes appear and then go off again and cannot be traced anywhere in Tasmania. On brackish estuaries and other large expanses of water, Coots will sometimes gather in immense, scattered flocks, mixing with the grebes, swans and other water birds that congregate out of the breeding season.

The Bustard, *Eupodotis australis*, is the last bird in this order, and frequents very different country from the waterbirds just dealt with. Its habitat is the open plains country where it may be seen singly, in pairs, or in flocks. Its range is throughout Australia where grass plains occur, but it is rare in south-western South Australia, Victoria and N.S.W. It extends to coastal districts only north of the Tropic of Capricorn as a rule.

In the early days of settlement in Australia, this was a common bird and many a bustard found its way into the cooking pots. The eggs were also eaten and both these and the bird were considered a great delicacy. The bustard, therefore, rapidly declined in numbers wherever settlement spread. Being entirely a ground-bird, it is also vulnerable to natural predators, and, no doubt, the introduced fox has contributed to its fate in the south-east.

However, in outback Queensland they are still relatively common and can often be seen as one motors along the open roads. In spite of persecution they are curiously unafraid and will walk slowly off, stopping at intervals to eye the intruder. If pursued they take to the air and sail off on broad, slow wings which may span nearly seven feet.

Their weight varies considerably, the heaviest recorded being 32 lbs., but 10-16 lbs. is a more average weight.

It is easy to imagine that such a bird would tempt a shot from the settlers and early travellers in Australia. Now of course, it is protected, but a number are still killed. In Western Australia it remains fairly common in unsettled areas—flocks into the hundreds being reported.

There is a plan, put into action by the Fisheries and Wildlife Department of Victoria, to reinstate this bird, so it may one day be possible to see Bustards in their ancient haunts across the plains of Victoria's Western District. It is hoped that the sporting section of the public will be persuaded to neglect this easy, but illegal, target for their guns—at least until the birds have established themselves. There is hardly a shooter in the whole country who would raise a weapon against a Koala or a Lyrebird, so why could we not regard the handsome Bustard in the same way?

The male Bustard has a very striking display. He struts about in front of the female with his barred tail raised and spread and head thrown back, as he 'booms' deeply to his watching mate. The curving wings are drooped to the ground and the plumes from the inflated fore-neck hang in a swaying, vibrating curtain.

No nest is made, the one or two eggs being laid on the bare ground. They are usually shielded by an overhanging tussock or low bush. The female, alone, incubates the eggs and the downy young, mottled in brown and black, leave the nest as soon as they are dry. Crouched against the earth, these chicks are almost impossible to find if they do not move.

The eggs are buff or greenish-buff, mottled and irregularly blotched with olive-brown, which may either be evenly distributed or tending to form a zone at the broad end of the egg.

The adult birds are omnivorous, feeding on grass, seeds, native fruits, small snakes and lizards; insects such as grasshoppers and beetles are taken, and even small birds.

The breeding season is from September to December as a rule, but varies in accordance with local conditions.

BUSTARD 48 in.

# CHARADRIIFORMES

Waders, Gulls and Allied Birds

This large order of birds that is, on the whole, associated with the sea-shore, can broadly be divided into three groups. There are the various families of birds known as the waders: secondly, we have the skuas, gulls and terns, and the third group (not represented in Australia) are the auks, puffins and guillemots.

Although they look so physically disparate, they are united by taxonomists on the basis of several structural peculiarities and behaviour patterns. Their fossils are ancient, going back about 75 million years or so, to the Palaeocene times.

The Waders in Australia (excluding the very rare vagrants) are divided amongst nine families.

The Lotus Bird is our only representative of the Jacanas. These are small birds with extraordinarily elongated toes which enable them to walk on the lily leaves which grow on the lagoons they inhabit.

We have one Painted Snipe in the family *Rostratulidae*, and two Oyster-catchers in the *Haematopodidae*.

The plovers and dotterels, *Charadriidae*, are a large group containing fourteen species.

In the next family, the *Scolopacidae*, are all those small greyish coloured birds of the sea-shore that are the bane of most amateur bird-watchers. On the whole they tend to be migratory—many travelling thousands of miles twice a year between their breeding and their wintering grounds.

The family can be conveniently divided into four sub-families which contributes somewhat to sorting them out.

These sub-families are: 1. *Tringinae:* Tattlers, Curlews, Godwits and allied birds; 2. *Scolopacinae:* Snipe and Woodcock (the latter not present in Australia); 3. *Eroliinae*, Sandpipers, Sanderlings and Knots; 4. *Arenariinae:* Turnstones and Surfbirds (the latter not present in Australia).

The Stilts and the Avocets are placed together in the family *Recurvirostridae*. They are long-billed birds with extremely long, delicate legs. Stilts are straight-billed and Avocets are curved—in both cases giving a clue to the bird's feeding habits. Stilts probe into the mud while the Avocets sweep their curved mandibles from side to side underwater or on the surface.

The family *Phalaropidae* is represented in Australia only by the Red-necked Phalarope. This is one of the three Phalaropes in the world, and it visits Australia only on rare occasions. These birds swim well and are unique amongst the waders in having lobed toes.

Stone Curlews are in the family *Burhinidae*. These are curious-looking birds that stand, statue-like, and stare at the world through baleful yellow eyes. Our two birds are not dissimilar to look at, but one is an inland bird of the tree-scattered grass-plains, and the other frequents beaches. Both have a weird and mournful cry, often uttered at night.

The ninth and last family in the wader group are the Pratincoles, *Glareolidae*. There are two in Australia. One, the Australian Pratincole, is a bird of the dry country while the Oriental Pratincole favours marshes and river flats. They both have a graceful, rather swallow-like flight and catch insects on the wing.

After the waders, in the order Charadriiformes, the next group are the Skuas, Gulls and Terns. The skuas are in the family *Stercorariidae*, and ranging into Australian waters we have three species: the Pomarine Skua, the Great Skua, and the Arctic Skua. All of these birds visit the Australian area whilst on migration from their breeding grounds.

The Arctic Skua and the Pomorline, breed in the Northern Hemisphere so will be seen locally in our summer which is the northern winter. On the other hand, skuas seen in Australian seas in our winter will probably be Great Skuas, as these breed on sub-Antarctic islands.

All the skuas are piratical, chasing smaller birds and forcing them to give up their food, raiding nests and foraging along the shore for carrion. The word skua is the old Norwegian name for these birds.

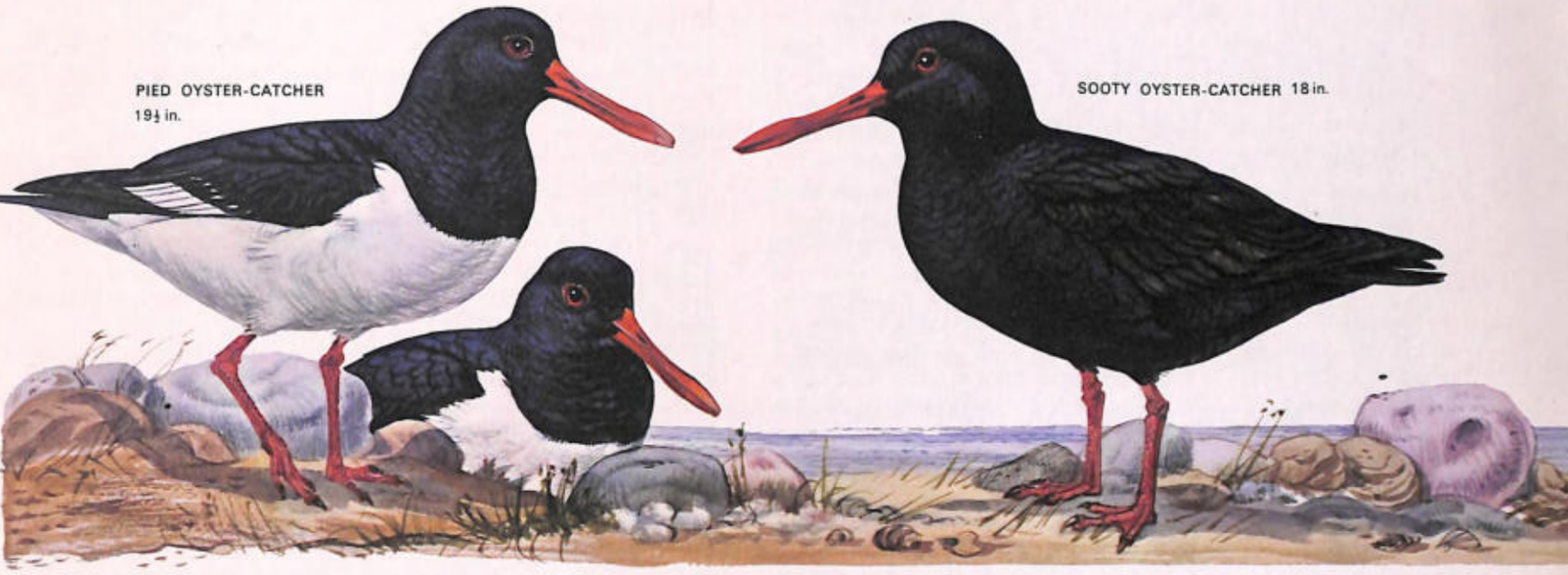
The family *Laridae* comprises the gulls and the terns. We have three gulls in this country; two of these are common and the third has lately been noticed extending its range from New Zealand.

There are twenty-one terns on the Australian check list, but five of these occur only rarely and are treated in the supplementary list at the back of this book.

One of our best known birds must surely be the Silver Gull, the ubiquitous 'sea-gull' of popular terminology. It is found along most of our coastlines and at times finds its way well inland to fresh water habitats.

The Pacific Gull is the much larger black-backed gull seen along our southern shores. The brown plumaged, immature birds of this species are erroneously thought by a lot of people to be a different species of bird. Even those who might know better, such as some fishermen, persist in calling them 'mollyhawks' and 'mollymawks' and attributing different habits to these birds.

PAINTED SNIPE 9½ in.




The Kelp Gull is a similar bird to the Pacific Gull but is slightly smaller and lacks the black tail band. It is sometimes seen in south-eastern waters and has been found nesting on an island off N.S.W.

Our terns are a more complex group, and the twenty-one birds are divided amongst seven genera. The 'type-group' *Sterna*, has eleven species, amongst which are our more 'domestic' terns, such as the Crested, the Little and the Fairy Terns.

Next come the three Noddies in the genus *Anous*. These are dusky, greyish-brown terns that nest in enormous numbers on our tropical and sub-tropical islands. A fourth noddy, in a different genus, is the Grey Noddy that breeds in the Pacific and is recorded as a rare vagrant to our east coast: this bird is dealt with in the supplement at the end of the book.

The three terns in the genus *Chlidonias*, are the Black, the White-winged Black and the Marsh Terns. The first of these is a vagrant and dealt with in the supplement. The other two birds are often hard to differentiate in the field as we usually see them in their winter plumage, or some intermediary moult—when they resemble each other quite closely.

White Terns, in the genus *Cygis*, breed in the Pacific, are vagrants to this country and treated in the supplement.

The Caspian Tern, *Hydroprogne*, is our largest tern and quite easy to identify by its size and heavy red bill. This bird's distribution is almost world-wide, and it is not uncommon in Australia. It does not usually breed in colonies as is typical of the other terns.

The Gull-billed Tern in the genus *Gelochelidon*, is another large tern with a wide distribution in the world. It can be separated in the field from the previous bird by its black bill. It frequents inland fresh water as well as the edge of the sea.

## JACANAS

The Jacana, *Irediparra gallinacea*, or Lotus-bird as it is more commonly called in this country, is basically a northern bird. Its range extends from Derby in Western Australia across to the east coast and down as far as Sydney. Occasionally these birds are found some distance inland but their chief haunts are the lakes and lily-lagoons of the coastal plains.

These birds have a singular development of their toes and claws—they are extraordinarily long and thin, enabling them to walk or run across lily leaves and other aquatic vegetation in pursuit of insects. Jacanas also feed on various plant life. They are wary, and if disturbed fly off with a chattering call and their long legs and feet trailing behind them.

They fly with a direct and rapid wingbeat, and with their necks extended. If alarmed suddenly they will sometimes 'freeze' and are then quite difficult to see because of the broken patterning of their plumage. They swim well and are said to dive in emergencies.

A flat nest is built of sedges and it is placed amongst aquatic vegetation at water level. Indeed, with the bird on the nest, it and the eggs are almost more *in* the water than on it.

Four eggs are laid which may vary in ground colour through pale brown, yellowish-brown, to brownish-red. They are decoratively marked with a network of fine lines and the surface is highly polished. The breeding season is from September to January, or sometimes later, probably depending on water conditions.

## PAINTED SNIPES

In the family *Rostratulidae*, there are only two birds, the Painted Snipes. Our bird, *Rostratula benghalensis*, is found in southern Africa, Egypt and Asia Minor, and across to China, Japan and southwards to Australia.

This snipe is polyandrous, that is to say the female will usually have two or more mates; she lays eggs in a corresponding number of nests, and leaves the male birds to incubate and later raise the young. She is larger and brighter than a male bird, which is generally the case in polyandrous species.

The trachea of the female is highly convoluted, and it is almost certainly she that is the author of the deep booming note of the species. They are vociferous during darkness.

These snipe are difficult to flush, and when they are put up, fly rather weakly with trailing legs to the nearest cover and are difficult to flush a second time.

Although probably not strictly a migratory species,

there is a good deal of north-south movement amongst these birds. Their food is aquatic plants and insects.

The nest may be built either on the ground or half floating in a wet marshy situation. In the former case, a hollow is lined with a few leaves and wisps of grass, otherwise, a more bulky nest is built from local vegetation. Four creamy-white eggs are laid, covered with black, grey and brownish spots and blotches. The breeding season is from October to January.

## OYSTER-CATCHERS

The next family is *Haematopus*, containing the two Oyster-catchers.

Pied Oyster-catchers, *H. ostralegus*, are the most abundant of our two species. Their range takes in most of coastal Australia and Tasmania. Usually in pairs or small parties, they may be seen hunting along the shore and rocks for the molluscs which make up their main diet—they also take any other small marine creatures they can catch or find. Their bill is strong and vertically flattened, and is an ideal adaptation for opening bivalves and prising limpets and other food off the rocks.

Their call is a loud, repeated whistle, with a rather mournful air. Oyster-catchers are often seen in the company of other shore-birds.

They lay their eggs in a depression in the sand, in shingle, or a bank of old and broken sea-shells. Two, or rarely, three, eggs are laid; these are brownish-white with dark brown spots over grey background markings. The eggs vary considerably from clutch to clutch. In southern Australia, they breed from October to January and in the north-west, from July to September.

The Sooty Oyster-catcher, *H. unicolor*, is an unmistakable large black bird, that is found in the same habitats as its relative and often mixes with them. It is inclined to be a more wary bird than the Pied Oyster-catcher and also appears to be less common. Its range is coastal Australia, but it is more common around our southern coasts. Black Oyster-catchers are frequenters of the more rocky shores; in contrast to the former species, their life and habits are otherwise much the same, so far as is known.

They lay their eggs in a scrape in the sand or on grassy banks above the tide-line. These birds often nest on small off-shore islands and reefs and the nest-site may be well above the water. Two eggs are usually laid which are appreciably larger and darker than those of the pied bird. The breeding season is from October to January.

## PLOVERS AND DOTTERELS

The plovers and dotterels, in the family *Charadriidae*, are a large group with fairly similar physical appearance. They are usually rather rounded and plump in outline and have short pigeon-like bills.

The Spurwinged Plover, *Lobibyx novae-hollandiae*, is a familiar bird to many people, with its loud alarm cries, pugnacious habits in the breeding season and bright yellow wattles. Its distribution is eastern Australia, from the Atherton area down to Tasmania, where it is particularly common. It is also found in most of South Australia and is extending its range into the south-west of the continent.

In pairs or flocks it frequents paddocks, marshes, and occasionally the beach. Spurwings are wary birds and very watchful, flying up with loud alarm cries at the slightest suspicion of danger. They are the bane of duck shooters, giving away the hunters' presence by flying and swooping overhead and calling loudly.

Their diet consists of small crustaceans, insects and herbage. The nest is a depression in the ground or the top of a tussock, lined with a few bents and grasses. Four pointed eggs are laid which are yellowish-olive, well marked with darker olive, brown and grey. Breeding season is from June to January.

The Masked Plover, *L. miles*, is a similar looking bird, but with a greater expanse of black down the back and sides of the neck. This is a northern bird found normally from the Kimberley area in the north-west across to central coastal Queensland. Recently, these birds have been reported from the south-west also, and are apparently extending their range.

Its habits and life history are much the same as the previous species although it may be more nomadic.

This bird's feeding habits are similar to those of the Spurwing, and also its nest. The eggs may be greenish or yellowish-olive, marked in much the same way as those of its relative. The eggs appear to be slightly smaller on the average. The breeding season is from January to April.

The Banded Plover, *Zonifer tricolour*, looks similar to the two spurwings in the field, but this bird has much more extensive black marking and lacks the spur on its wing. Its distribution is Australia-wide, including Tasmania, but it is rare in the north of the continent. Partly nomadic, these plover appear and disappear at various times in different districts, depending on seasonal conditions and related food supply.

It is as noisy as the other two birds, swooping over an intruder with raucous calls, especially if its eggs or young are close by. These birds feed on seeds, plants, and insects. Four or sometimes three strongly pyriform eggs are laid, which vary in colour to match their background. Birds nesting on a grassy site will lay olive eggs, but eggs on lighter soil will be correspondingly sandy in colour. They are marked and spotted in much the same way as the spurwing's eggs. The breeding season is from June to November.

The Red-capped Dotterel, *Charadrius alexandrinus*, is one of the common small birds on many of our beaches. It is also found along the muddy banks of rivers and fresh water marshes. Its range is Australia generally and Tasmania. Usually singly or in pairs, but sometimes in scattered numbers, these little birds will be seen running along the margin of the water or along the lines of tide-wrack, hunting for insects. It dashes forward on rapidly twinkling legs, stops momentarily to snatch up some titbit, and then runs on again, erratically changing direction as it goes. If disturbed, this dotterel will fly off for a few yards, only to alight again and run on.

They usually, but not invariably, nest close to water, either the sea or a lake. The two eggs are laid in a depression in the sand or shingle. This nest scrape is often decorated with small pebbles or pieces of broken sea-shell. The eggs are a pale greenish colour with spots of dark brown over lavender markings. The breeding season is normally from August to December or January.

The Black-fronted Dotterel, *C. melanops*, is a bird of inland waterways rather than the sea-shore; it may, however, be seen at times along the mud-flats of estuaries. It is found in suitable localities throughout Australia and Tasmania.

This dotterel is usually seen in pairs or family parties, foraging along river banks, lake and swamp margins and has even been recorded in cities. They run with great rapidity, stopping and starting suddenly as they feed. If disturbed, they fly off with a plaintive 'chick-chick' note of alarm, but soon alight again.

The nest is usually situated on a shingle bank or similar situation and is seldom far from water. The nest-hollow is lined with very small pebbles and the three eggs are stone-grey to greyish-yellow. They are marked in brown and

lavender and extremely difficult to see against their background. The breeding season is from September to December or later.

The Oriental Dotterel, *C. asiaticus*, is an Asian species migrating here from the Mongolian area. It arrives in Australia during September, and departs about March.

These dotterels frequent salt-marshes and lagoons and the sea-shore; they are also met with inland in suitable areas. They are usually in small scattered flocks feeding on insects, worms and crustaceans, procured from the mud and sand. They are swift flyers and zig-zag erratically as they go. Being wary birds, they are quicker to fly than some other dotterels and, when disturbed take to the air, uttering a sharp whistling note. Their upright stance and long legs differentiate them from other dotterels, also the head is held high, rather than in line with the body, and is frequently "bobbed".

The winter-plumaged birds (which we usually see here) lack most of the chestnut and black on the fore-neck and breast which characterises the breeding plumage. This dotterel breeds in south-east Mongolia, but its nest and eggs have not been discovered.

The Mongolian Sand-dotterel, *C. mongolus*, is another migrant from Asia. They usually arrive in flocks about September and depart during March. Some birds stay throughout the year, but have not been recorded as breeding. These dotterels are more common in the northern parts of Australia, but a few work their way down to Victoria and south-western Australia. Their call is 'clear and musical' and is described elsewhere as a penetrating 'drrrit'. Their haunts are tidal flats, rocky foreshores, and the banks of estuaries. The winter plumage lacks the rufus colouring on the breast, head and hind-neck.

They breed in Siberia, laying three creamy-buff, brown-spotted eggs. The nest is a typical dotterel 'scrape', lined with a few dried grasses. When the young birds hatch, the families move up from the beaches to higher ground, and are frequently met with hunting for insects at 1,000 feet or so.

Large Sand-dotterels, *C. leschenaulti*, breed in Siberia and migrate, to escape the northern winter, to Africa and Australia. They seldom penetrate far down our continent, and are very rare in the south. They have been recorded as 'the commonest wader' about the Derby area in the north-west, and are plentiful on Melville Island, for example. The adult bird is chestnut on the crown and hind-neck and has a narrow collar of the same colour on the upper breast. There is also a black mark before the eye which a bird in winter plumage lacks.

They lay four eggs; these are described as 'ochre with a greenish tint' laid in a shallow scrape. They nest in sand or shingle on the borders of lakes.

The Double-banded Dotterel, *C. bicinctus*, is another winter migrant to Australia but from a relatively short distance. This is a New Zealand breeding bird which visits us about February or March, and by October most of them have departed again; this is our only land-bird which is known to be a regular migrant between New Zealand and Australia.

It would be difficult to confuse this bird with any other wader when in full breeding plumage, but in its winter dress or in intermediary moults, the distinctive double bands on the chest may be missing or only slightly developed. It might be confused with a Red-capped Dotterel in winter dress, but is larger and more active: the Mongolian Sand Dotterel is much the same size, but in a good light it will be seen that they lack the rufus shades of the Double-banded Dotterel. It is common in winter in south-eastern Australia and its range extends up the coast to north-eastern Queensland and across southern Australia. Further west it becomes increasingly sparse until, in south-west Australia records of it are quite rare.

These Dotterels are usually in small flocks, and they frequent the sea-shores, tidal mud-flats, and salt-marshes. Occasionally they penetrate inland a short distance. When disturbed, they fly up on rapid wings with a piping whistle call of 'twilt-twilt'.

A few birds remain throughout the year but have not been found breeding. In New Zealand the nest is a typical dotterel hollow in the shingle or sand. Three greenish-brown eggs are laid, which have dark brown markings. The breeding season is from August to December.

The Hooded Dotterel, *C. cucullatus*, is a southern bird, being found from about Geraldton in Western Australia around our southern coasts to the south-eastern corner where it rarely travels as far up as Sydney. It is common in Tasmania, in fact Sharland considers this island to be the 'stronghold of the Hooded Dotterel'.

In the south and east, this is a bird of the sea-shore and occasionally coastal lagoons. In Western Australia, by contrast, this dotterel is a frequenter of inland salt-lakes. Usually in pairs, but sometimes in family parties, these little birds will be seen running rapidly along the beach or lakeside. On the beach they are often down on the wet sand, picking up food as each wave recedes.

They nest on the ground, laying their two or three eggs in a depression in the sand, shell-bank or seaweed. Often the nest is close to some object such as a washed-up log or pile of seaweed. The eggs are a sandy stone colour, well marked with black and lavender. The breeding season is from August to January.

Unlike most of the family, the Red-kneed Dotterel, *C. cinctus*, is mainly a bird of the inland. It is well distributed in most areas, but becomes progressively rarer towards the north of the continent; it is particularly common in the south-west of Australia.

In pairs or small flocks these dotterels haunt the margins of swamps, lagoons and river-flats. They are seldom found far from water, but rarely visit salt-water habitats.

Rapid and erratic, they run along the ground, stopping every so often to look about with their heads up, before hurrying on once more, stabbing left and right as they go, at insects on the sand.

The nest is a slight hollow which may be close to the water in damp earth or sand; alternatively, they build amongst the cover of stones, grass or low vegetation, such as salt-bush. Four is the usual clutch, and the eggs are cream or creamy-brown, freckled and scribbled with black. The breeding season is from October to December.

As is usual with dotterels, and the plovers, generally, the eggs are pyriform (that is to say, strongly pointed at one end) and are arranged with their narrow ends inwards. One of the reasons for this is that these birds lay large eggs in relation to their body size. This pyriform shape is the most efficient for fitting a number of bulky objects into a small area, because the narrow ends fit neatly together, leaving little waste space between them.

The Golden Plover, *Pluvialis dominica*, is a migrant, arriving here during September and October after its breeding season in the Northern Hemisphere's summer. It is fairly common along most of our coastline, except in the west, where its relative, the Grey Plover is more common. It is usually seen in small flocks and frequents the beach, mud-flats of estuaries and salt-marshes. Its feeding habits and daily movements are often related to the tides. As the water comes up, covering their feeding spots, the birds move back to the coastal marshes and even grassy paddocks. As

the tide recedes, the birds return to feed across the freshly exposed flats. These plover are seldom seen in breeding plumage in this country.

Grey Plover, *P. squatarola*, are very similar-looking birds in winter plumage, but may always be distinguished from the Golden Plover by the broad white bar across the upper tail.

In south-western Australia the Grey Plover is much more plentiful than the Golden Plover—which is the reverse of the situation in the east. The arrival and departure times of both birds are much the same.

The Inland Dotterel, *Peltohyas australis*, is found in the middle parts of Western Australia, throughout the Northern Territory, western Queensland, south to north-western Victoria and inland South Australia.

In pairs or in small flocks these handsomely-marked dotterels frequent the open plains and the margins of lakes and rivers. They may often be met with some distance from water.

These birds appear to be nomadic in some degree, although a few localities have a permanent population of what may be the same birds.

A gradual approach may result in a person getting quite close to these dotterels, but if startled, they fly off and will go a considerable distance before alighting again. Their call has been described as a metallic 'quick' or 'quoick'. There is another, lower call, sounding like 'kr-root'.

They feed on seeds and insects and nest on the ground. The three eggs are laid in a simple unlined hollow and the birds have the singular habit of covering their eggs with sun-dried pellets of earth when they leave the nest. The pointed eggs are creamy or buff and spotted lightly with black and dark brown. The breeding season is from April to October.

## SANDPIPERS AND ALLIED BIRDS

As stated in the introduction to the Charadriiformes, this next family, the *Scolopacidae*, may be broken down into four main sub-families. These will be dealt with here in the same order as in the introduction.

Sub-family *Tringinae*.

The Wandering Tattler, *Tringa incana*, migrates here from Alaska (it is also known in Asia) to escape the northern winter. It arrives here in our spring and departs again about April to return to its breeding grounds.

It is not a common bird in this country, but may occasionally be seen in small flocks on our northern beaches and much less frequently further south. This small greyish

wader usually favours the more rocky parts of the coastline. In its winter plumage it is almost indistinguishable from the Grey-tailed Tattler, *T. brevipes*, although Mathews describes the feet of *brevipes* as dull yellow while those of *incana* are shown as dark olive-green in the plate.

In its summer plumage *incana* is heavily barred blackish all over the underparts and *brevipes* less so with a plain belly and under-tail coverts. Birds may be met with in Australia with some barring, either at the end of their breeding plumage or at the commencement of their nuptial dress just before they leave here. The call the of *incana* is described as 'ter-wee' repeated in 'fluty tones', and another call is 'troo-eet'.

The Grey-tailed Tattlers, *T. brevipes*, arrive here in small flocks about September or October and most have departed again by the end of April. They come from eastern Siberia, where it is presumed they breed, although there are no records of nests or eggs being found.

It is much more rare in southern Australia than in northern parts, where it may be seen on mangrove swamps, rocky shorelines and mud-flats. On Melville Island, they have been reported as plentiful and in full summer plumage.

The Greenshank, *T. nebularia*, is another wader that visits us from the Northern Hemisphere. They arrive in small flocks during September and October and start again on their long journey north in March and April. A few stragglers remain until May and an odd bird here and there will stay the whole year.

Single birds, pairs, or scattered flocks of no great size, may be seen along the beaches, feeding across tidal mud-flats or visiting salt-marshes. They are very wary birds and a good deal of caution is required to approach them. Ducks and other birds heed their warnings and, if a Greenshank leaps skywards with its loud whistle of 'tewy-tewy', other birds nearby become agitated and watchful. It has another call which it sometimes utters when it is put up—a double 'chee-wit'.

They feed on water insects, and other minutiae of the mud and water. In Britain, they have been recorded as feeding on small-fry of various fish, and they probably have the same habit in this country.

With its long legs and long, slightly upturned bill, this wader should not be too difficult to separate from others of its kind. In flight it also has a very noticeable white rump; the Marsh Sandpiper also has a white rump and is a similar-looking bird, except that it is about four inches shorter; it is also considerably less common.

The Greenshank is plentiful in Tasmania and southern Australia, becoming progressively more scarce northwards. It is found by both coastal and inland water.

Common Sandpipers, *T. hypoleucos*, are small greyish waders that arrive in this country in the spring and depart again in the autumn.

The name, of course, was given to them in the northern hemisphere where they are common, but except in Western Australia they are one of our rare waders. In Tasmania there are practically no authenticated records of this bird.

They arrive in Australia in the spring and spend a few months before departing in time to breed on the other side of the world.

This sandpiper frequents muddy beaches, rocky foreshores and the banks of rivers. On Melville Island, when the spring-tides cover the beaches, they have been observed feeding in the forest country which comes right down to the beach. Indeed, in Britain, which is one of the places they breed, these birds frequent the sea-shore only in winter. The rest of the year is usually spent on lowland streams and up in the hills. Here the birds' haunts are the swift trout-streams. In some places in Australia their behaviour is not dissimilar, where they may be seen walking along the banks of rivers and perching on rocks in mid-stream to snatch insects from the water.

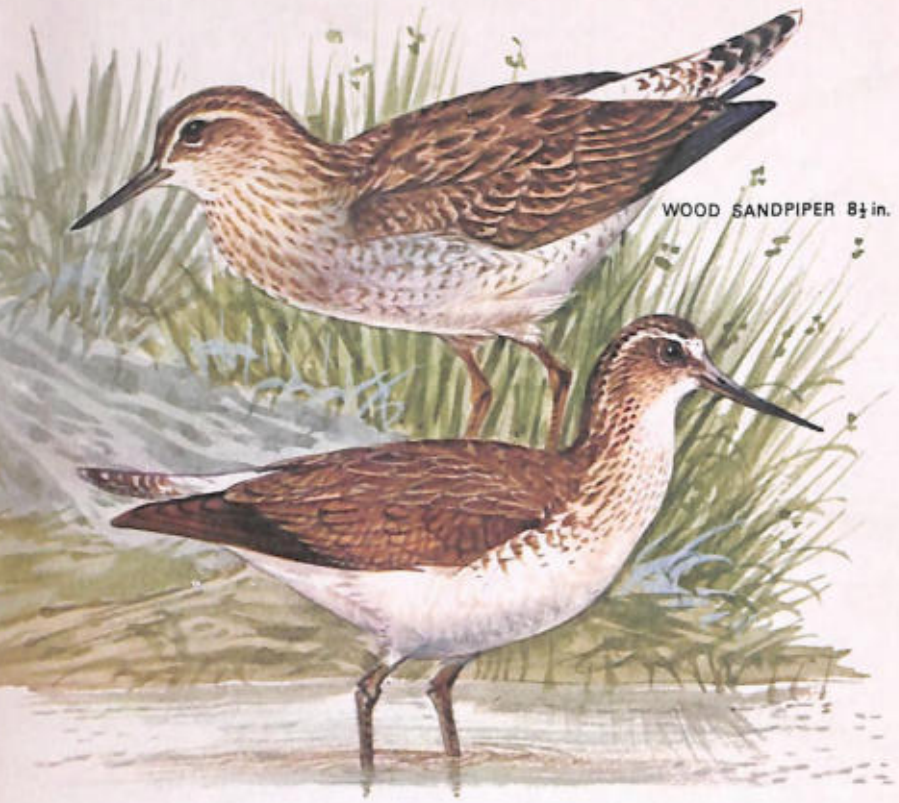
It is interesting that this sandpiper can swim under-water, but I have come across no records of other waders doing this. The following is an account by a collector in Northern Australia in 1901: 'One can then get a gunshot at them, but if not promptly killed they are difficult to secure, because of their cleverness at diving. When I wounded the one forwarded, it fell into clear water. Upon trying to pick it up it went under and swam as easily as a Grebe. It used its wings . . . and moved rapidly through the water'.

The Common Sandpipers feed on small crustaceans, mud-worms and insects. Whilst perched on some rock or other prominence, or between its dashes across the mud, this bird stands with head and tail bobbing—a characteristic which it shares with the Greenshank, the Terek and Wood Sandpipers.

The call note is a tremulous whistle, described as 'kitty-needy' and 'willy-wicket', quickly repeated two or three times.

There is little or no difference between the winter and breeding plumage of this bird. There is no white on the rump, but a white wing-bar shows when the bird is in flight.

MASKED PLOVER 15 in.




MARSH SANDPIPER 8½ in.

The Wood Sandpiper, *T. glareola*, is another small wader which visits us from northern Asia. It is not recorded as common anywhere in Australia although it is a fairly regular visitor during our summer.

In the field, they are not unlike a miniature greenshank, having the same upright posture, with the head held high on an extended neck, rather than hunched down between the shoulders.

These sandpipers were first added to the Australian list in 1896 with specimens collected in the north-west of the continent; since then they have been recorded in all other states except Tasmania. Unlike most waders they are not frequenters of the shoreline and salt-marshes. Their habitat is swampy pools and river margins. These birds also frequent timber-fringed water courses and pools and may be seen perching in trees—which is very unusual amongst the waders—and they also swim well.

Their call note is described as a sharp, high 'chee-chee-chee'.

A very similar bird is the Green Sandpiper, *T. ochropus*, which has not yet been recorded in this country. It is quite possible that it does visit our shores in the summer, but has not been noticed because of its similarity to the last species. The Green has a darker back than the Wood and is less patterned; the tail is whiter, having only three or four dark bars, compared with eight or so in the Wood. The underwing of the Green Sandpiper is blackish, and light grey in the Wood Sandpiper; while the axillaries of the Green are pale brown, barred white, but white, lightly barred sepia in the Wood.

The calls are probably the easiest method of distinguishing the birds. The Green Sandpiper has a loud, double 'ku-wit' or 'too-wit' quite distinct from the triple whistle of the Wood Sandpiper.

The Marsh Sandpiper, *T. stagnatalis*, is one of our rarest waders, and is recorded sporadically as a summer visitor in all our States except Tasmania. It frequents fresh water marshes and river banks rather more than marine environments. The Marsh Sandpiper resembles a Greenshank except that it has relatively longer legs and a thinner bill. In its winter plumage—the most likely to be seen here—this bird has white underparts and a greyish brown back. With its slightly up-tilted bill and dark greenish legs, it bears a close resemblance to the Greenshank and careful observation would be needed to distinguish them in the field, particularly as they often feed and travel with flocks of Greenshank. Its call and flight are recorded as being similar to those of the Wood Sandpiper, from which it may be distinguished by its paler colour and longer legs.

Included in the same sub-family, *Tringinae*, as the foregoing birds, but in a genus of its own, is the Terek Sandpiper, *Xenus cineveus*. This small wader is an uncommon visitor to Australia, but over recent years it has been recorded more frequently: this is probably due as much to an increase in bird-watchers and keen fieldwork, as to any influx of birds. The Terek Sandpiper is not unlike the Common Sandpiper in its field characteristics; it is similarly active and has the same habit of bobbing its tail.

In Western Australia they are more common in the north, and this is likely to be true across the continent, as the birds migrate here from the Northern Hemisphere, and no doubt only a few individuals work their way down to southern Australia. They have been recorded a number of times around Melbourne but are considered to be 'accidental' to Tasmania. Their habitat is the seashore, salt-marshes and estuaries.

The Curlew, *Numenius madagascariensis*, is a very distinctive bird and by far the largest of the family. Its towering size and enormous down-curved bill make it unmistakable even at a considerable distance; and it will usually be seen only from a distance, as it is a wary bird, and quick to fly at a hint of danger. At low tide, curlews feed far out on the mud-flats, singly or in scattered flocks, probing into the soft mud with their long bills. Now and then their mournful 'curlew' cry will be heard as they call to each other. They are also vociferous at night, calling as they feed or as they fly over in small flocks.

Curlews do not breed in this country, but arrive here about September or October. Most of them depart again during March and April to breed in the Northern Hemisphere, although a small number remain in Australia throughout the year. It may be that these are young birds not yet in breeding condition, although there is no proof of this.

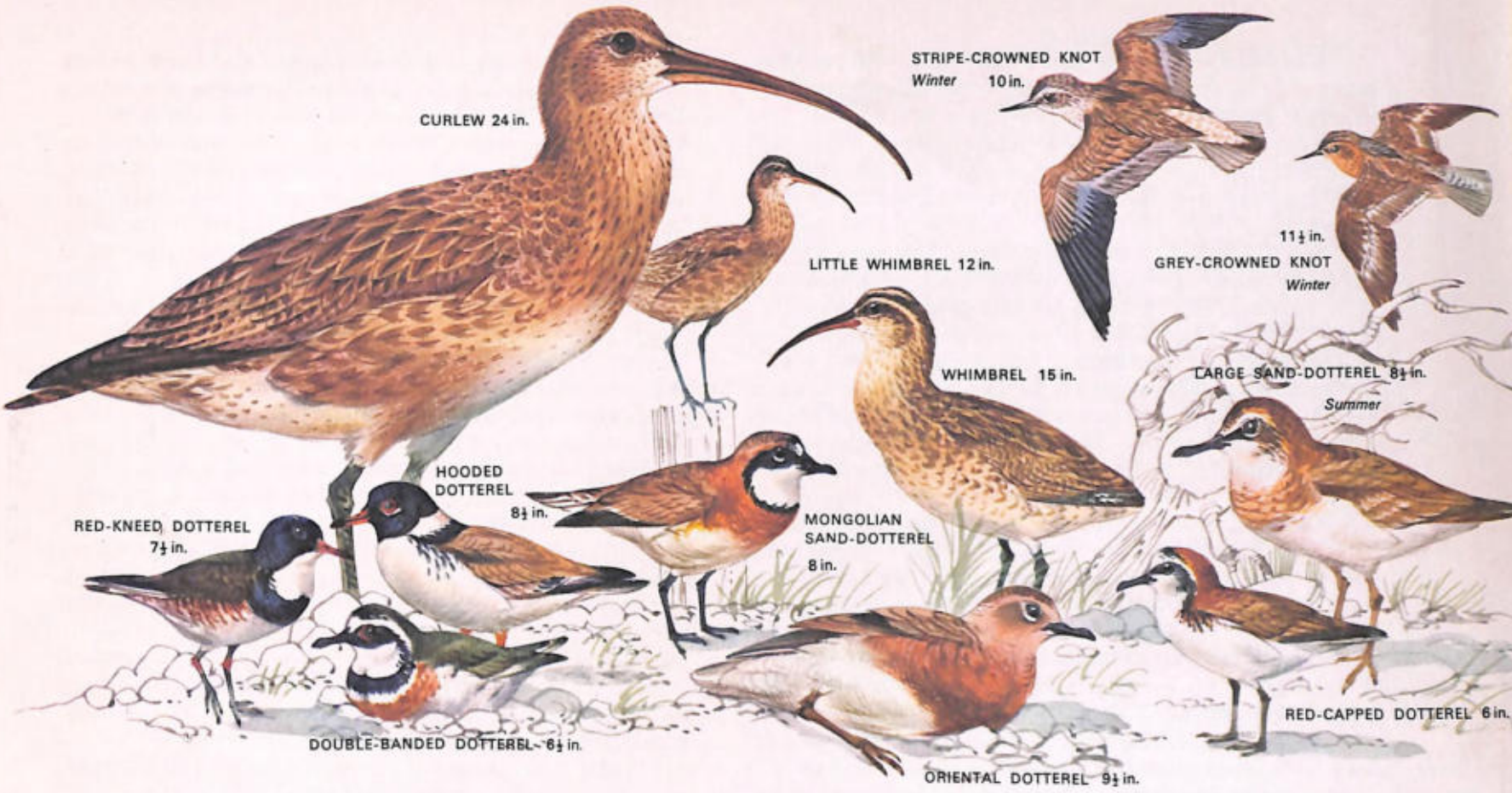
Their call is well known and one of the wildest sounds to be heard over the tidal mud-flats. There is actually a good deal of variation in the sounds that these birds make. When undisturbed, their cry is low and mournful, but if put up, the curlews rise with a sharp 'curlee-curlee' or even a high single yelp, if surprised suddenly.

In Western Australia they are recorded as appearing singly or in small groups, but in the east, large numbers sometimes congregate. I have counted flocks of fifteen hundred or more, towards the time of their departure for their breeding grounds.

In the air they are deceptive, moving with rather measured wingbeats which do not suggest the considerable speed at which they are actually travelling.

The Whimbrel, *N. phaeopus*, is a smaller version of the curlew, and is a bird with similar habits. The name Whimbrel is of ancient origin and probably derives from the bird's call. 'Titterel' is a local British name which is also derived from the Whimbrel's rippling call-notes.

These waders arrive in Australia during September and October and depart again in March and April. The habitat of these birds is normally salt-marshes, tidal flats and estuaries, where they may be seen foraging over the mud or along the beach in much the same manner as their larger relatives.




Passing over inland waterways on a journey, Whimbrels will sometimes drop down to feed for a while, but on the whole frequent fresh water less than the curlew.

As well as more muddy places, the Whimbrel also favours rocky foreshores where it may be seen probing amongst the weed for crustaceans and molluscs.

It is not as shy as the curlew and will remain quietly feeding after the larger bird has flown off in alarm.

Their size should serve to distinguish them from curlews, but if they are not seen together for comparison, there are a number of field marks to look for. The Whimbrel's bill is much shorter and less curved, and it has a whitish rump which is noticeable in flight. The curlew's head is a fairly uniform speckled brown, while the Whimbrel has a distinct dark eye-stripe and light 'eye-brow'. The Whimbrel also has two dark stripes along its crown, divided by a narrow buff line.

The call might be described as a rippling 'ti-ti-ti-ti' rapidly repeated. It will also give a yelp of alarm when startled into flight. This bird is rather more common down the eastern coast and may sometimes be seen in small flocks, mixing with other waders. In the west of Australia it is considered to be one of the rarer waders and particularly in the southern areas of Western Australia; further north, however, it becomes more plentiful—particularly about February and March, when they are gathering for their long flight northwards.

Little Whimbrels are included as *Numenius* by some taxonomists who name it *N. minutus*, but by others it is placed in a separate genus and called *Mesoscolopax minutus*. It is separated by Mathews, for example, on various points, including the following: 'The metatarsus is regularly scutellated both before and behind, a feature which distinguishes it at once from the Numenoid Waders, . . .'. This bird may be told apart in the field from the Whimbrel by the darker rump and shorter bill.

They migrate to this country from northern Asia, arriving here during September and October and departing in our autumn. Little Whimbrels appear to feed on open grassy places as frequently as on salt-marshes and mud-flats. They may also be seen resting by fresh water dams as they pass through a locality on migration. These birds were often seen 'on the open plains near Derby' and in outback Queensland (near Richmond) . . . 'they suddenly appeared in thousands . . .'.

The Little Whimbrel is closely related to the Eskimo Curlew of America. These are the birds which once migrated between the northern tundras and Patagonia in millions that darkened the sky as they passed. Due to Man's depredations, they are now probably extinct.

The Little Whimbrel's call is described as 'whai-ut-whai-ut' uttered loudly and boldly. The bird is less common in the southern parts of our continent.

The last two species in the sub-family *Tringinae* are the Godwits. The origin and meaning of this strange name are unknown, but it has been used in England for very many years.

Bar-tailed Godwits, *Limosa lapponica*, usually arrive in Australia about October and stay until April. It is also quite common for a few birds to remain throughout the year. These wintering birds sometimes moult into their breeding plumage, a handsome pinkish-brown about the head, neck and breast, but there is no record of them nesting here. Often in the company of other waders, these long-legged birds stalk across the tidal flats of our beaches and river mouths.

These Godwits are not particularly rare, wherever they occur in Australia, but they do tend to be more common in the north than the south.

They are quite distinct from all other waders, and should be easy to identify in the field as godwits, but unless they are seen together, it is more difficult to distinguish the two species.

The Bar-tailed Godwit does not always have its tail barred—in winter plumage the retrices are greyish with only faint markings, but the upper tail coverts are always barred. These birds feed by picking up various marine invertebrates in the tip of the mandibles; the morsel is then rapidly jerked back up the length of the bill and into the bird's mouth. They also probe in the mud and wet sand for worms and small crustaceans. The bill varies somewhat in its length and also in its upward curve; it may be from 3–5 inches long.

Although, in walking and standing positions, godwits are fairly long-necked birds, in the air they pull their necks in and fly with their heads sunk upon their shoulders. The flight is rapid and complicated manoeuvres are sometimes performed by tight flocks of birds. When feeding in flocks, these birds often keep up a wheezing undercurrent of notes, but in flight there is a quite different harsh, double call, difficult to syllabise.

The Black-tailed Godwit, *L. limosa*, may be recognised from the foregoing bird by its longer legs and straighter bill —indeed, in some specimens the bill appears almost straight and rapier-like. The long legs trail noticeably beyond the tail when the bird is in flight. A blackish tail, contrasting with the white coverts, is also an identifying mark. The Black-tailed also has a whitish wing-bar lacking in its relative. The Black-tailed Godwit's flight is also distinctive being stronger and less erratic than the other bird.

These waders have various calls; a flight call which is a rapid chattering 'kak-kak-ka' and a repeated 'wikka'. On the ground the birds have a rather anxious 'kee-veek' sound.

Although the Bar-tailed Godwit is noted as common in Tasmania the Black-tailed has not been recorded there. Throughout the rest of Australia this bird may be seen in pairs, singly, or in small flocks. It tends to be common further north. They arrive in Australia in October and November and depart again for the Northern Hemisphere during our autumn. On the whole it is a much rarer bird in this country than the Bar-tailed Godwit.

### Sub-family *Scolopacinae*

The second sub-family of the sandpipers and their allies, is the *Scolopacinae* containing the snipe and woodcock. In Australia we have no woodcock and two snipe (the painted snipe being classified separately).

The Japanese Snipe, *Gallinago hardwickii*, is the common snipe of Australia. As its name suggests, it is a Japanese breeding bird, migrating here to escape the northern winter.

This well-known game-bird is the bane of many a sportsman, because of its erratic flight. It is such a morsel of a bird that its esteem as game must rest on the difficulty of its procurement rather than on any real contribution to the table. When flushed, a snipe rockets into the air with a short harsh call—'scaap'—and rapidly zig-zags off. When out of gunshot, it straightens out and flies some distance further before dropping back to cover.

Snipe tend to spend the day in the cover of some marshy spot and at dusk they 'flight'.

In ones and twos, or in 'whisps', as small parties are called, they dash up out of the sedges and vanish into the darkness, calling as they go. They feed during the night along swamp edges, river margins and other wet places. The long bill is probed into the mud in search of worms. Slightly swollen and pitted at the end the tip of a snipe's bill is a sensitive pair of forceps. The last inch of the upper mandible can be raised and lowered enabling the snipe to

pull worms from the mud even at the full depth of its probe. It is even possible for the bird to swallow its food without the bill being withdrawn from the mud.

The famous 'drumming' of the snipe is probably never heard in this country as it is part of their breeding display. During its display the bird flies up with rapid, strong wing-beats and then dives steeply, with tail wide-spread and wings half open. As it plunges down, the rush of air through the outer tail feathers makes a drumming or bleating sound, not unlike that of a goat kid. Both the male and the female are said to indulge in these drumming flights.

The Japanese Snipe is found throughout eastern Australia and Tasmania but has not been recorded for the west. 'Snipe years' vary, some summers being good seasons and others producing very few of these little waders.

The Pin-tailed Snipe, *G. megala*, breeds in eastern China and Siberia and migrates here from the northern winter. Quite common in New Guinea, this snipe is less often seen in Australia, although it is occasionally recorded in north-western Australia.

In the hand, *megala* can be distinguished by the twenty tail feathers; in *hardwickii* there are only eighteen. The coloration of *megala* is richer than the other snipe and the dark crown stripes are much more obvious; it is also a smaller bird.

The habits of the Pin-tailed Snipe in Australia appear to be much the same as its larger relative and it frequents similar marshy spots. Usually in small flocks, these snipe arrive here about September or October and start flying north again in about March.

### Sub-family *Eroliinae*

The third sub-family in this order is the *Eroliinae*, the sandpipers and their relatives, numbering seven species in this country.

First there are two Knots: these are stout little birds with long pointed wings, short tails, short straight bills and rather attenuated legs.

The Grey-crowned Knot, *Calidris canutus*, is a visitor during our summer, coming here between breeding seasons in the Arctic. It is found along most of our coastline on suitable shores, where it frequents coastal sand and mud-flats and the muddy banks of rivers and estuaries.

The bird was first added to the Australian list by Gould in his handbook of 1865, with birds collected from Moreton Bay in Queensland. Since then, it has been recorded from all states but is considered uncommon in Tasmania, where it was first recorded in 1953.

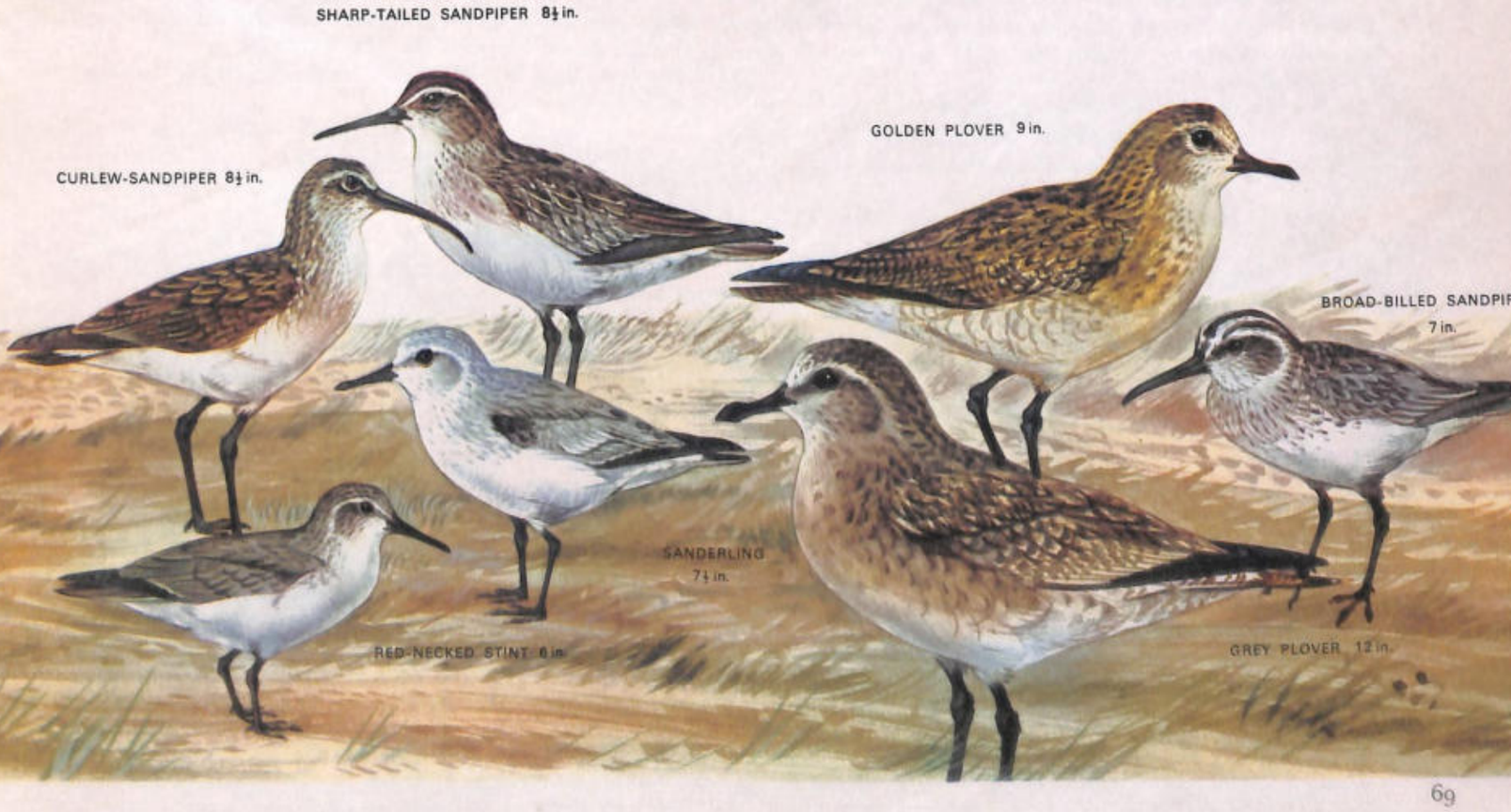
These knots are greyish-coloured birds in their winter plumage—which we normally see here—the rump and tail are a lighter grey and there is a narrow white wing-bar, which are aids to identifying the bird in the field.

Whilst waiting for the tide to drop, and thus exposing their feeding grounds, knots can sometimes be seen gathered on a exposed bank in dense flocks. They pack themselves in shoulder to shoulder, so tightly on occasion, that not an inch of sand is visible between their grey bodies.

The birds feed, following the receding tide, both during the day and at night. Their winter food is marine worms, small molluscs and crustaceans, but in summer, on their breeding grounds, they are largely vegetarian, eating the seeds of various aquatic plants.

Knots are strong fliers and, when put up, go off with a great rush. They bank and turn in perfect unison flickering grey or silver as they present first their backs and then their bellies to the observer. The flock bunches up or strings out into a long line as they go and, after a great deal of flying and wheeling, the birds will often land on almost the same spot from which they fled.

The Stripe-crowned Knot, *C. tenuirostris*, appears to be a less common visitor to our shores than the foregoing species. Like many of our waders, it is also more common in the



TURNSTONE 8 in. *Summer*

north. They arrive from eastern Siberia at the beginning of our summer and depart again at the end of it.

Its habits and habitats are similar to those of *canutus* so far as it is known.

The next bird in the sub-family *Eroliinae* is the Sanderling, *Crocethia alba*, in a genus by itself. This small wader has an almost world-wide distribution. It nests in the Arctic and migrates as far as southern America, Africa and Australia. The Sanderling, as its name suggests, prefers sand to mud-flats and is more often seen on the beach than on muddy estuaries. It will also visit inland water whilst on passage. They are very energetic little birds, dashing about on a blur of short black legs in pursuit of sandhoppers, and running out after retreating waves to snatch up stranded molluscs.

In the hand, this bird may be distinguished from all other small waders by the absence of a hind toe, but with the bird scuttling along 30 yards away, this is not much aid to identification.

The birds which visit us are in winter plumage, and in this garb are considerably lighter than other waders of the shore; in a good light, Sanderlings look positively pearly white.

They do not fly readily, but run along ahead of an intruder faster than a man can walk. If pressed they will take off on fluttering rapid wings, skim low out over the sea to sweep in again to the beach, behind or ahead of the intruder. As the birds run they will sometimes hold their wings up—tips to the sky—as they go.

Sanderlings arrive in Australia about September and depart again in April as a rule. They are widely distributed, but are not common in this country.

We have four waders in the genus *Erolia*, the first of these, the Red-necked Stint, *Erolia ruficollis*, is also very commonly called the Little Stint. Our bird is actually the eastern Siberian form and distinct from the *E. minuta* of Europe.

This small bird is one of the common waders of our coastlines and marshes, both salt and brackish. These stints usually arrive in southern Australia about August and in Tasmania in early September. They are active in their search for food, but do not speed along in the same way that the Sanderlings do. Stints feed on marine worms, aquatic insects and small crustaceans, and are usually seen foraging in mixed flocks with other waders such as Sharp-tailed Sandpipers and Curlew Sandpipers. When feeding on a marsh, they will swim quite readily to cross small pools and puddles that are too deep for their short legs. Most of their food is picked off the surface of the ground or water, but occasionally they can be seen stabbing into the mud at a retreating worm.

They fly swiftly in tight flocks or groups, wheeling and turning in perfect unison, flashing white or dulling grey, as they bank. The call is a triple 'Tchick-tchick-tchick', sharp and rapidly repeated. They also have a more twittering 'communication call' whilst feeding.

Some stints remain with us throughout the year, although not necessarily attaining full summer plumage. Birds coming into breeding dress before they leave for the north are not infrequently seen: these becoming more reddish on the back and rufus tones developing on their finely speckled breasts and necks.

The Curlew Sandpiper, *E. ferruginea*, is another common summer visitor to our shorelines. As with many others of our waders, these birds breed in Siberia and the bulk of the migrants reach Australia in about September and depart again in our autumn. However, this sandpiper has been recorded in every month of the year in various parts of Australia.

Its relatively long, down-curved bill is distinctive and identifies the bird readily if a good view is obtained, otherwise the strikingly white rump is the most obvious field characteristic.

When put to flight, the birds go up with a 'twee-twee-twee' call or a more solitary 'twer-ret'. As a flock of these sandpipers moves slowly along, feeding, they keep up a low musical twittering. At high tide the birds congregate to rest on exposed spits of sand or move back to adjacent salt-marshes. A few hours later they return, to follow the ebbing tide on to the freshly exposed feeding grounds.

Their flight is rapid and strong, but less erratic and aerobatic than that of the sanderlings or stints.

Specimens developing their summer plumage are not uncommon: the upper parts become more reddish-brown with stronger black and grey markings and the underparts become somewhat chestnut. Birds in full breeding dress have even been seen, but there is no suggestion that they nest in this country.

The Sharp-tailed Sandpiper, *E. acuminata*, is also a wader that visits Australia in large numbers. They mix in flocks with other waders along most of our suitable shorelines. These sandpipers come down from Siberia to arrive about September: they depart again in our autumn and it appears that, unlike some other of our waders, none of them stay here the whole year.

An interesting example of a banding recovery was the case of one of these sandpipers banded at Swan River (W.A.) on January 5th, 1961 and killed in Siberia on May 28th of the same year.

These birds favour salt-marshes over beach habitats, although they are by no means a rare sight on the beach. Sometimes they are also seen inland, where numbers will visit, for a time, the margins of a fresh water lagoon or swamp.

They feed on the usual wader diet of marine worms, aquatic insect life and the other small fry of wet places.

The Sharp-tailed may be distinguished in flight from the Curlew Sandpiper by its tail pattern. While the latter bird has a plain dark tail and white coverts, the Sharp-tailed has dark coverts but a conspicuous white margin down each side of its dark tail.

Breeding plumage birds may sometimes be seen towards the end of their stay here, in which case the greyish bird becomes a more reddish-brown on the back and develops a wash of warmer colour on the chest and neck.

In a separate genus is the Broad-billed Sandpiper, *Limicola falcinella*. This bird is similar to the Sharp-tailed Sandpiper in general appearance and behaviour. It also has the same tail pattern as the Sharp-tailed; it is, however, smaller and the bill is heavier and relatively longer and slightly down-curved at the tip. The whiter eye-brow and darker legs of the Broad-billed species is also noticeable in a good light.

It appears to be confined to northern and eastern Australia, as far south as Melbourne in the east, but only down to Broome in the west. It is not common anywhere within its Australian range, and its habits and habitats are similar to those of other shore-waders in this country.

Sub-family *Arenariinae*

The fourth and last sub-family of sandpipers and their allies is the *Arenariinae*, containing the Turnstones and Surfbirds. We have none of the latter in this country, but do have one Turnstone.

Our Turnstone, *Arenaria interpres*, is one of two species (divided into various forms) found throughout most of the world. The other species is the Black Turnstone, *A. melanocephala*, which breeds only in Alaska. The Surfbird, *Aphriza virgata*, also breeds only in Alaska, but inland on high mountains.

The Turnstone is a summer visitor to our coastlines, arriving with the majority of the other waders in about September and departing for the Northern Hemisphere during March and April.

They are amongst the most handsome of the waders in their breeding dress, which they do sometimes assume in this country, although Turnstones have never been known to nest here. They are active on the beach and along rocky foreshores in their search for food. As the name suggests, they have the habit of turning over small stones in search of sandhoppers, small crabs and other invertebrates of the tide-line. Weeds, shells and other flotsam are also flicked over as the bird hunts along the strand.

The Turnstone is not a particularly shy bird, and will often allow a close approach before flying off, to land further along the beach.

These birds have a stubby, short-necked outline and this, combined with their habit of resting on the top of an exposed rock or promontory, make them an easy wader to spot and identify.

It is common in varying degrees along most of the Australian coastline, particularly on beaches with rocky outcrops. To Tasmania it is a regular migrant in small numbers.

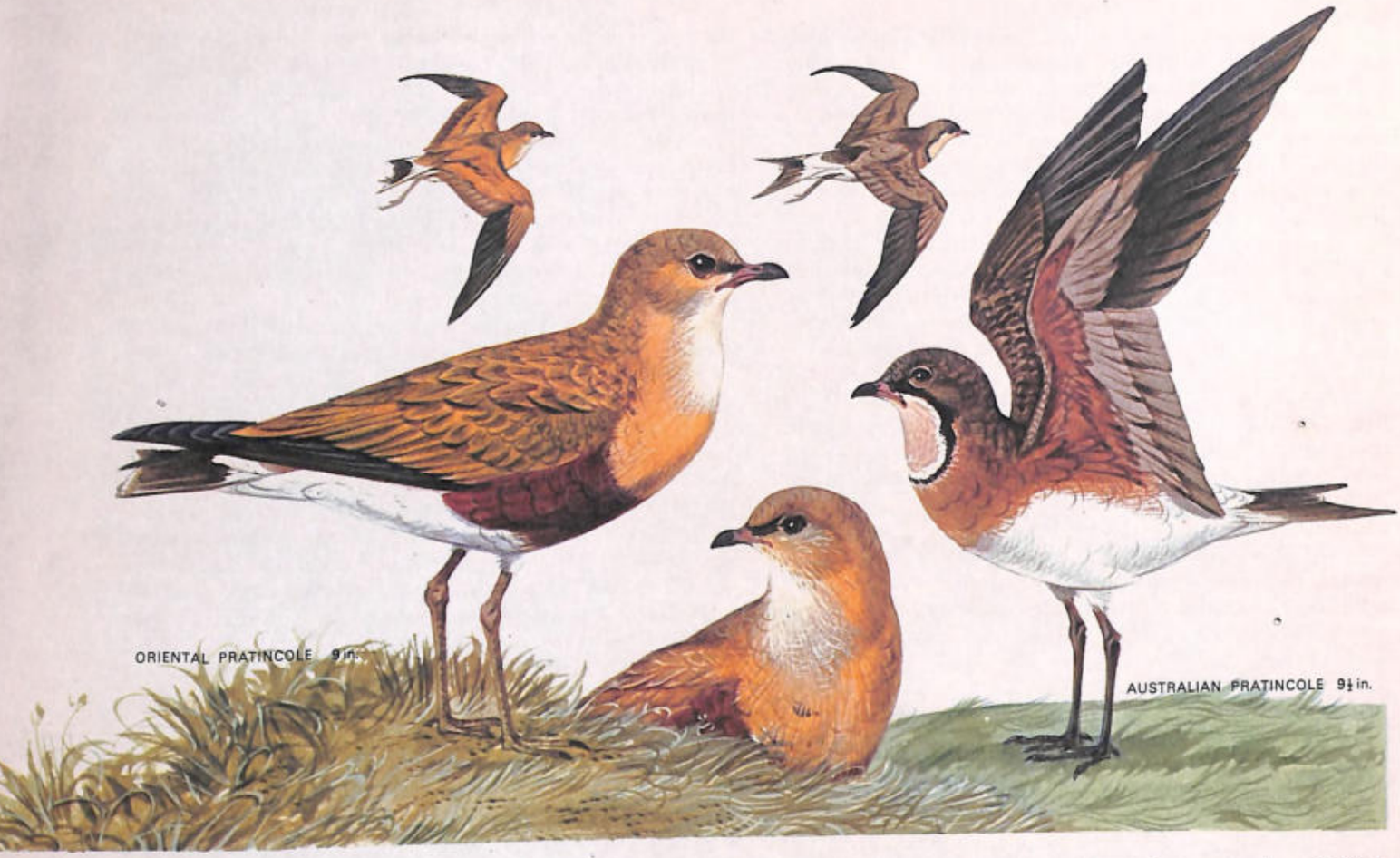
## STILTS AND AVOCETS

We have two stilts and an avocet in this country which are all long-legged graceful birds usually seen in flocks—sometimes numbering hundreds. To see a group of these decorative, smartly coloured birds, feeding and resting in a long line against a backdrop of sparkling water and the grey-green foliage of the littoral, is a truly aesthetic experience.

The White-headed Stilt, *Himanotopus leucocephalus*, is a black and white bird with extremely long pink legs which trail far beyond the tail when the bird is in flight.

This bird is found throughout Australia where suitable marshy places exist. It is less common in the far north and the south-west corner of the continent. It is also recorded as a rare visitor to Tasmania.

White-headed Stilts are frequenters of inland swamps, shallow lakes and marshy streams as well as similar situations by the sea. They may also be seen on the beach and tidal




flats feeding in company with the hosts of other waders.

As a rule they are shy birds, not allowing the intruder any closer than a few hundred yards. They fly with rather rapid, shallow beats of their pointed black wings, giving their strange high yapping cry that sounds remarkably like that of a small dog.

The White-headed Stilt tends to nest in colonies although I have found solitary pairs with a nest. The nest may be merely a scrape in the mud near the edge of the water, lined with a few pieces of grass. On the other hand, some birds will build a substantial pile of aquatic vegetation in shallow water.

Four pyriform eggs are laid which are olive or greenish-grey, spotted and blotched with purplish-brown with background markings of lavender. The breeding season is from August to December, although this possibly varies locally in a dry season.

Banded Stilts, *Cladorhynchus leucocephalus*, are essentially birds of the inland salt-lakes, although from time to time there are records of them visiting estuaries and salt-marshes. They are seldom seen in fresh water habitats.

The food of these birds is usually the brine shrimps and other small crustaceans found on the salt-lakes of the interior. They nest in colonies, laying their eggs in a depression in the ground. Three or four eggs are laid which are quite dissimilar to those of any other stilts. The egg is chalky and matt, with a ground colour varying between deep fawn and white. The eggs are marked with twisting scribbling lines of black and dark brown, some eggs are also blotched with the same colours. Unique amongst wading birds is the pure white down with which the young are covered when they first hatch out.

In 1816 the Banded Stilt was first scientifically named and described, but it was not until August 1930 that a nesting colony was discovered. A large number of birds was found nesting on a sandspit on Lake Grace in Western Australia. The same year, but in December, approximately 50,000 birds were found breeding at Lake Callabonna in South Australia.

In August 1945 and August 1946 attempts were made by these stilts to nest again at Lake Grace, but both times they were flooded out. It is apparent that the nesting season of these birds is governed by the sporadic rainfall over the salt-lake system of the south and west of the continent. The rainfall and consequent relative salinity in the salt-pans would, in turn, probably influence the populations of the birds' main food supply, the brine shrimps.

The Banded Stilt's distribution is throughout southern Australia from Point Cloates in the west to Maryborough in Queensland. It is a very infrequent visitor to Tasmania. The call is a slightly weaker version of the White-headed Stilt's yapping cry. Sharland also records a 'plaintive whistle'.

In the early days of settlement these birds and the other stilt and avocet were considered good eating and were frequently shot for the pot; their eggs were also considered a delicacy. On Rottnest Island, off Western Australia, where the Governor once maintained his summer residence, Banded Stilt shooting was one of the attractions of a sojourn there and bush 'blinds' were built along the lakes to conceal the shooting parties.

The Red-necked Avocet, *Recurvirostra novae-hollandiae*, has one of the strange bills of the bird world. It curves strongly upwards for most of its length but towards the tip there is a pronounced down-curve, giving the bird a most odd appearance. The bill is also somewhat flexible. One of the feeding techniques of this bird clearly indicates the reason for such a strangely shaped bill. The Avocet wades

into the water and reaches downwards and outwards at such an angle as to bring the recurved bill-tip parallel with the water. As the bird wades forward, the bill is swept from side to side, on or just under the surface, to gather the minutiae of water-life that constitutes its food. They will also probe into the soft mud around the edge of a swamp or under water.

The Avocets' toes are well webbed and they frequently swim across narrow arms of water. They may often be seen feeding up to their bellies in water, and no doubt frequently find themselves out of their depth.

If put up, they fly off in a rather laboured fashion with their extremely long shanks streaming straight out behind them. In flight they have a yapping note very similar to that of the two stilts: they also have a 'trumpet-like whistle' which is also usually a flight call.

The Avocet's nest may be a hollow in a clump of herbage, either on a small island, or near the margin of the water; alternatively, some birds construct a nest of aquatic plants, mud, salt-bush and the like, in shallow water. They prefer salt-lakes as nesting sites such as Lake Grace and Lake King in the west.

The eggs are similar to those of the White-headed Stilt, but larger. Four pyriform eggs are laid and these are olive to creamy-brown in ground colour, with round spots and blotches of dark brown and inky-grey background markings.

## PHALAROPES

There are three species of Phalarope in the world and one of these—the Red-necked Phalarope—is a rare vagrant to Australia. As with other very infrequent visitors to this country, it is treated in the supplement towards the back of this book.

## STONE CURLEWS

We have two stone-curlews, contained in separate genera. One is a bird of the littoral and the other an inland species of dry-country habitats.

The Southern Stone-curlew or Bush Curlew, *Burhinus magnirostris*, as it is now being called, is a rare bird that was once much more common. Its range, theoretically, is throughout Australia and Tasmania, where it frequents open forest country and plains with scattered belts of timber. Although a 'wader' by definition, this bird has forsaken watery habitats and does not hunt for its food in the mud and shallows of swampy land.

These curlews are rather mysterious-looking birds: they have great yellow eyes, that have an almost mad stare in them. They are very wary birds and, being so well camouflaged, depend largely on immobility as a means of escaping danger. It is not unknown for the birds to let themselves be picked up, retaining their horizontal 'freezing' position until replaced on the ground.

They are nocturnal in the main—a hint of this characteristic being given by the enormous eyes—and vociferous through the hours of darkness. They call especially on moonlit nights. The soulful 'ker-loo, ker-looo' is an eerie sound when heard in the lonely bush.

ZOOLOGICAL GARDENS CALCUTTA ALIPORE

It is unusual to put one of these birds to flight, for if they jump up from their flattened posture on the ground they will usually run rapidly off, rather than take wing. Even if surprised into flight, they usually pitch again soon and run through the scrub.

Mathews has a report of strange, almost dance-like antics of this bird. 'At times these Plovers performed peculiar antics or dances. When in this humour, one of the birds would run with outstretched wings 20 or 30 yards, bending occasionally to this or that side, or even turning suddenly completely around . . .'

The Bush Curlew's food is given as insects, but they may also take larger prey, as birds in captivity will eat mice and half-fledged small birds. If given one of these, the plover will take it by the head and bang it about—suggesting perhaps, that it is quite familiar with killing things larger than insects.

No nest is made by these birds, the one or two eggs being laid on the bare ground, often amongst small stones, pine-cones or other bush debris, presumably to help disguise the clutch. There is sometimes variation in the size of the eggs, even within the clutch. From fresh eggs the sitting bird will steal away if disturbed. But when incubation is more advanced, the bird flattens itself to the ground, relying on its own protective coloration for protection.

Serventy reports that Bush Curlews have been known to move their eggs several yards after being disturbed by a human.

A typical egg colour is stone grey with blotches of dark brown, but the ground colour tends to vary to match the background upon which the eggs are laid. The breeding season is from August to January.

There appears to be some difference of opinion about the generic name of our other stone plover. Known popularly as the Beach Stone-curlew or Beach Curlew, some workers have called the bird *Esacus magnirostris* and others *Orthorhamphus magnirostris*.

The Beach Curlew is a northern Australian bird which is found along the coasts and on offshore islands. This is a much larger-billed bird than the inland species and the white bar on the shoulder is very distinct, both at rest and in flight. Actually it is unlikely that the species could be confused as their habitats do not overlap.

The beach-bird's range is from Point Cloates in the west across the top of the continent and down the east coast as far as the Tweed River in N.S.W. Its call is very similar to the 'ker-loo' of its relative, but it is harsher and less flutey.

No nest is made, the single egg being laid on the beach, either in sand or shingle with not even a vestige of nesting material gathered around it.

## PRATINCOLES

We have two pratincoles in this country, separated into different genera. The Australian Pratincole, *Stiltia isabella*, is a dry country bird on the whole and typically a bird of the inland. They do, however, spread to coastal districts in certain areas. Its range is northern Australia, western Queensland to north-western Victoria, inland South Australia and the interior of Western Australia.

These pratincoles appear to be nomadic, although suitable areas maintain a population throughout the year. Near Wyndham they are common in the wet season December to February, but depart during March. In some seasons quite large influxes of these birds will appear in certain areas, only to be uncommon again for a number of years.

They are very long-winged birds and swift, graceful fliers. They hawk for insects in the air and also pursue them on foot—being able to run very rapidly. When the bird stops, it rocks back and forth, see-sawing as though loose at the junction of legs and body. It is fond of warm dusty roads and runs along ahead of vehicles in a bold manner.

The Australian Pratincole lays its eggs on the bare ground and they are particularly hard to see, so closely do they represent their surroundings. Two or three eggs are laid and these are a pale stone-colour, marked with pale grey over which are brown blotches.

The fledglings are equally well camouflaged, but not content with this, the parent bird usually leads the youngsters to some small crevice or burrow mouth where the young birds can conceal themselves still further.

An adult bird disturbed at its nest is a great exponent of the 'broken wing' trick; it flutters and tumbles along the ground in its efforts to entice off an intruder. Sometimes the sitting bird will not quit the nest until actually touched, and then only leaves under protest, pecking at one's hand as it goes.

These birds fly and call quite frequently on moonlight nights, and may be heard as they pass over on their north-south migrations or other wanderings.

The Oriental Pratincole, *Glareola pratincola*, is a bird, native to southern Europe and eastern Asia, which migrates to Australia. It usually arrives here from December onwards and departs again in March and April. Its numbers fluctuate, in some years in certain areas there being hundreds, and in others none at all.

Unlike our other pratincole, this bird catches almost—if not all—its food on the wing. It hawks for insects on long swallow-like wings, often hunting well into the dusk, until it becomes hard to see them.

They are associated in bush-lore with the coming of rain, both amongst the white people and the aborigines. The following extract from a paper in the Proc. Roy. Soc. S. Aust. Vol. XXII, is an interesting example of an aboriginal tribe's views on these birds. 'The examples secured were shot whilst skimming over a swamp, from which they were retrieved by a little black urchin about eight years old. The natives were very indignant at my shooting these birds, and a deputation from the blacks' camp explained for my edification that if I killed any more a big rain would come and never stop until it had washed everything away.'

Its distribution in Australia is chiefly in the north and north-west of the continent, but occasionally a few records are obtained down as far as Victoria and South Australia. These birds frequent marshes, open plains and river flats —any type of open country in fact, where insects are to be found.

They do not nest in this country and it would seem that no birds spend the whole year here.

Also contained in the Charadriiformes is a group of birds very different in appearance from the waders; these are the skuas, gulls and terns.

## SKUAS

There are three Skuas to be seen in Australian waters: as a rule two are seen in our summer, and the third is a winter visitor.

The Great Skua, *Catharacta skua*, is a very large dark bird which could be confused with a Sooty Albatross in general appearance; its flight, however, is quite different, not having any of the superb gliding characteristics of an albatross. It is also somewhat similar to the giant petrel, but this bird does not have the piratical and aggressive habits of the skua.

The Great Skua is usually seen harrying other sea-birds. It pursues any luckless gull or tern which may be carrying food, and usually succeeds in forcing the bird to jettison its tit-bit. These skuas also scavenge along the tide-line for offal and are great nest robbers. Their prey also includes any small mammals that they can catch, insects and fish. They are, in fact, the 'birds of prey' of the sea.

Great Skuas have the distinction of being the only birds that nest in the Arctic and Antarctica. The birds we see are winter visitors, coming up to our warmer seas after breeding in the summer on sub-Antarctic islands such as Macquarie. The Arctic birds winter in warmer seas further south than their nesting grounds, but there is no evidence to suggest that the northern birds change hemispheres or that the northern and southern birds meet at their wintering grounds.

The nest is a shallow depression in the ground, lined with dried grass. Two glossy eggs are laid, which are a dark stone colour with darker brown markings. The breeding season is from November to January in the south. It is seldom that the skuas raise more than one offspring. Due largely to the inclement weather, incubation must start as soon as the first egg is laid; as there are a few days between laying, one young bird hatches well before the other. When the first-born is strong enough, it starts to wander away from the nest and is usually killed—either by other skuas or the territory-conscious parent.

The Arctic Skua, *Stercorarius parasiticus*, is a smaller skua that visits Australian seas in our summer, on migration from its Northern Hemisphere breeding grounds. They are dispersed along most of our coasts, but are more common in the east.

This bird has two colour phases: a dark and a light. In the former, the bird lacks the light underparts with the mottled chest-band—being uniformly dark all over except for some birds with a rather lighter collar behind the head. The dark phase is more common.

They arrive in our seas in about October or November and depart during February and March.

Typically skua-like in its habits, it is a predatory bird, eating almost anything it can catch, including the young and eggs of other birds.

Skuas do not travel inland over temperate countries, but in the Arctic and Antarctic have been seen far from the sea. The Arctic Skua has been seen near the North Pole and Scott saw a skua about 150 miles from the South Pole.

If food is in the offing skuas show little fear of man, and will swoop in to pick scraps off the water only a few feet from small fishing vessels.

The Pomarine Skua, *S. pomarinus* (pomarine is sometimes spelt pomatorhine) is another bird of the Northern Hemisphere that migrates to our seas. They are not uncommon around our southern coasts, although most records are from the south-east.

When they are present (they may be moulted by the time the bird reaches Australia), the two broad and elongated, twisted tail feathers should serve to identify this skua. In the Arctic Skua the long central tail feathers are pointed and in the Great Skua they are also pointed, but hardly project beyond the rest of the tail.

The Pomarine Skua is also dimorphic, having a light and a dark phase. Their habits and life history are similar to those of the other skuas.

## GULLS

There are three gulls on the Australian list, two indigenous and common, the third a fairly rare visitor.

The Silver Gull, *Larus novae-hollandiae*, is the ubiquitous 'seagull' of popular terminology. They are common along most of our shore-lines, except some of the wilder steep-cliffed areas: neither did I find this bird along the beaches of the Northern Territory near Darwin.

In some localities, this sea-bird has moved inland forming colonies on areas of water a considerable distance from the sea. Inland, the birds may be seen feeding in open fields.

It is a useful scavenger, like most gulls, cleaning the beaches of marine offal and scraps thrown overboard by ships. The Silver Gull also feeds on small fish, crustaceans and any other sea-life it can catch. It is a great nest robber, taking the eggs of other sea-birds and waders. They nest in colonies in a variety of situations: small off-shore islands.

shingle spits, exposed sandbars that carry some low cover and on artificial areas of water, such as salt-works and ornamental pools.

In Western Australia, there are some colonies that have two nesting seasons each year, and it may be that this is true in other localities also.

Any given spot will have its population of gulls all the year round. Some of these may be permanent residents, but the fact that some individuals travel is indicated by banding recoveries. Gulls banded in Melbourne have been recovered in Hobart, Sydney and north-western N.S.W.

The nest of these birds varies a good deal. Sometimes the eggs are laid in a simple hollow pressed out in vegetation by the bird's body, in other cases a proper nest is built. This may be constructed of twigs and lined with grass and rootlets, or it may be a bulky construction of sea-weed. In Western Australia, these gulls are recorded as laying their eggs in depressions in rocks.

The eggs vary considerably, with a ground colour of olive-green, bluish-white, pink, or stone. They are usually thickly marked with blotches and scribbles of brown and black. The shape, too, varies from short and round to longer and tapering or oval.

The Pacific Gull, *L. pacificus*, is a very much larger bird, and correspondingly more fierce and predatory. This is a southern Australian gull, found in Tasmania and along our coasts from Point Cloates in Western Australia to north-eastern N.S.W. At the northern and western extremities of its range, it becomes rather rare; Victoria, Bass Strait and Tasmania are the strongholds of this bird.

This bold gull may be seen singly, in pairs, or small groups, foraging along the shore for offal of the tide-line. Like the silver gull, they also follow ships and fishing boats to squabble over any jettisoned scraps. They are great predators and cause a good deal of havoc amongst colonies of nesting sea-birds and waders. They take both eggs and fledglings and, on occasion, will kill adult birds. I once watched half a dozen Pacific gulls killing and eating prions. The huge gulls swam amongst the delicate grey birds and reaching out, would snap up a victim and give it a few hard shakes, which largely de-feathered it. The prion was then torn up and quickly eaten. It was odd that the other prions swam about the voracious gulls, apparently quite unconcerned.

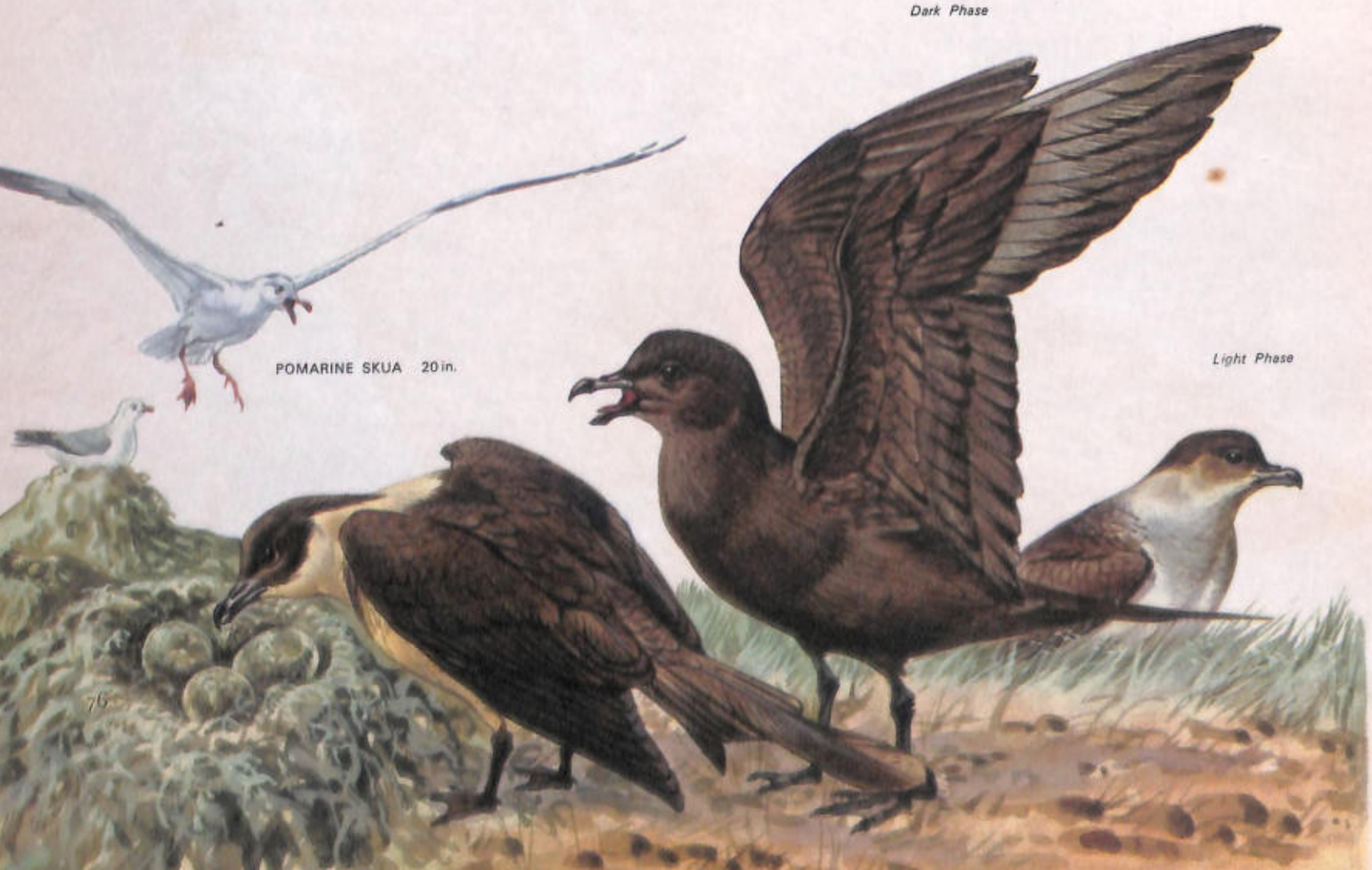
Pacific Gulls also have the habit of carrying shellfish, such as mussels, high into the air and dropping them to break open the shell. In my experience they seem to lack the sense to distinguish between rocks and sand, however, and will drop a mussel half a dozen times on sand, where once on rock would be sufficient. Serventy, however, cites cases where the birds 'apparently have "dropping" platforms on which a litter of turbo shells and other material accumulates'.

These gulls nest from south-western Australia to Tasmania and on islands in Bass Strait. Without being strictly colony nesters, they do tend to congregate at suitable sites. A nest is made of grasses, weed, rootlets and similar herbage. This is usually placed in the shelter of a low bush or tussock or is tucked between rocks.

The one, two or three eggs are grey to olive-brown, blotched with darker browns and lavender. The breeding season is from September to January.

All gulls are a mottled brown colour in their juvenile plumage, and through successive moults, over a number of years, they gradually attain adult plumage. The Pacific Gull in particular seems to have given rise to confusion in this matter. The young, dark brown birds, are thought (quite wrongly) by many people to be a different species, and are sometimes called 'mollymawks' or 'mollyhawks.' The latter name is defended on the grounds of the bird's voracious appetite and fierce habits.

The Dominican Gull or Kelp Gull, *L. dominicanus*, is a



New Zealand bird which has recently been extending its range to include south-eastern Australia. This gull is also found in South America and South Africa. In appearance, it is rather like the Pacific Gull, but it is slightly smaller and lacks the black sub-terminal band on the tail.

In 1958 the Dominican Gull was found nesting on Moon Island, N.S.W. and recently has been recorded increasingly in Victoria, Tasmania and N.S.W. Its habits and life history are similar to those of the Pacific Gull.

## TERNS

We have the considerable number of twenty-one terns on the Australian list. Five of these are rare visitors or vagrants, and, apart from being mentioned briefly below, will be dealt with at the back of the book.

The genus *Sterna* has the most members in this country, with eleven species. The Arctic Tern, *Sterna macrura*, breeds in the Northern Hemisphere, but is a very far-ranging migrant, coming south as far as the Antarctic. It has been recorded from the seas of all our southern coasts from West Australia to Victoria and Tasmania. An interesting banding recovery was a bird marked at Murmansk, Russia, in July 1955, and found alive ten months later near Fremantle, W.A.

The Common Tern, *S. hirundo*, is a rare visitor and dealt with at the back of the book.

White-fronted Terns, *S. striata*, may be seen along the south-east coast of Australia from about mid-Queensland to the south-east of South Australia. Sometimes they are also present in Tasmanian waters.

This is a common tern in New Zealand, where it breeds, but is fairly rare in our seas.

Most of the birds we see are immature specimens on an east-west migration. They may be seen singly (mixed with other terns) or in small flocks frequenting estuaries, harbours and the beach.

It is interesting that there are three eggs in the Tas-

GREAT SKUA 25 in.

manian Museum that are labelled as having come from South Bruny, Tasmania, in 1885. If these are genuine Tasmanian-taken eggs, it is a most unusual record, as there do not appear to be any other cases of this tern breeding in Australia.

The eggs (normally two, which casts a *slight* doubt on the Tasmanian clutch) vary from yellowish-stone to greenish-grey or coffee colour. They are marked with spots and background markings of grey.

The Crested Tern, *S. bergii*, is one of the most common terns in our southern waters. Mixing freely with the gulls it may be seen on most of our beaches, but perhaps more around the southern coasts than the northern. As the name suggests the bird is able to raise its crown feathers into a shaggy crest. The bird uses this in its displays but usually looks somewhat crested and untidy about the head.

These terns feed by diving into the sea to catch shoal fish such as pilchards. A flock of these birds, excitedly fishing, is usually a good indication of a large school of fish travelling up the coast.

Crested terns breed in colonies, often quite large, on off-shore islands. The one egg is laid in a simple depression in the sand or earth, and on Seal Rocks, Victoria, I have seen the eggs laid in a hollow on the bare rock. Sometimes two eggs are found, but these are considered by Serventy to be ' . . . probably the product of two different pairs'.

The eggs vary enormously in ground colour and markings. No two eggs are alike, and the dark brown and blackish scribbles form intricate patterns and hieroglyphic-like markings, on the light to dark stone ground colour. The breeding season is from October to January.

The Lesser Crested Tern, *S. bengalensis*, is a wide-ranging species, found from the Mediterranean to northern Australia. Its distribution in this country is from Point Cloates in West Australia across to Masthead Island in Queensland, which is one of its breeding stations. These terns also nest on other Australian islands within their range.

The Lesser Crested Tern is a much shyer bird than its larger relative but otherwise its habits are much the same. The orange bill should serve to distinguish this bird from the Crested Tern which has a yellow bill. In its breeding plumage the Lesser Crested has a black forehead, whilst the Crested has a white one. In the winter moult, however, the smaller bird's forehead becomes extensively white.

The single egg is quite different from the Crested Tern's, being light stone to white or pinkish-white in ground colour. It is spotted and blotched with dark purple and reddish-brown, many of the markings having the appearance of being under the shell. The egg is laid in a depression on the bare sand and the breeding season is from May to November.

The Little Tern, *S. albifrons*, is a delicate and beautiful bird with a dancing flight. It is our smallest tern and it is a marvel that such a tiny bird can cross oceans, but it is, nevertheless, a wide ranging species. Little Terns are found from Europe through Africa and southern Asia to Australia. Its range in this country is from Broome in north-western Australia around our northern and eastern coastline to eastern Victoria. It has not been recorded in Tasmania.

These terns are usually seen in small flocks, flying back and forth above the water. They flicker along with typical hovering flight, their heads down, watching for small fry. With a neat turn and a dive, they plummet into the water every few minutes, sending up a plume of spray, and, swallowing the fish underwater, they then fly straight up again without pausing on the surface.

Sandspits at the mouths of inlets and estuaries are favourite nesting sites, but they also colonise island beaches. Two or three eggs are laid in a depression in the sand, usually not far back from the high-water line. The eggs are creamy-white to stone or coffee brown, spotted with blackish-brown, umber and grey. The breeding season in Australia is from October to January.

The Fairy Tern, *S. nereis*, is a similar bird, but slightly larger. They may be told apart chiefly by the lack of black on the tip of the Fairy Tern's yellow bill. The upper parts of this bird are paler, and there is less of a black mark in front of the eye.

Its flight and fishing habits are similar to those of the Little Tern, and it is equally pleasant to watch a party of these delicate 'sea-swallows' fishing in the shallows just off shore.

Except in eastern Victoria and part of N.S.W., the normal ranges of these two small terns do not overlap. The Fairy Tern, is found from King Sound in Western Australia around our southern coastline to N.S.W. It is also quite common in Tasmania.

For no apparent reason these terns will desert a prepared nesting area. There might be great activity for a few days, with territory squabbles and nest-scrapes prepared, but then the terns will leave for a different beach. Alternatively, populations will fluctuate; a handful of pairs nesting where last season there were dozens of birds.

The colonies are situated on sandy spits, low sandy islands in estuaries and bays, and on island beaches. The two eggs are laid on the bare sand and are similar to those of the Little Tern. The breeding season is from November to February, which is relatively late in the season.

Sooty Terns, *S. fuscata*, are in general tropical and sub-tropical birds. Their range in Australia is the coasts of western, northern and eastern Australia, as far south as Wollongong on occasion. There is a somewhat apocryphal set of eggs, seen by A. J. Campbell in 1901, that were said to have been collected on Green Island in Bass Strait. He was ' . . . unable to collect confirmatory evidence of the statement.' It is very unlikely that sooties would nest so far

south, although a vagrant bird might wander to Bass Strait on migration. These birds are oceanic and may be met with far from their breeding grounds.

Sooty Terns usually nest in vast colonies and are often associated with equally extensive Noddy Tern colonies. The juxtaposition can exist harmoniously as the sooties nest on the ground, and the noddies build in the tops of bushes.

Some local colonies have been wiped out, or nearly so, by the depredations of egg-collecting fishermen and other intruders. This tern, however, is still a common bird.

The Sooty Terns are remarkably tame and the thousands of birds hardly react to the human visitor. Adult birds will even allow themselves to be picked off the nest. On some Western Australian islands when guano collection was in progress, the birds happily ignored trucks and other machinery.

All over the colony there is constant activity: birds wheeling overhead loud-voiced, calling 'wide-awake, wide-awake', partners greeting each other at the nest, and young birds calling for food. As a background to the cacophany is the all-pervading smell of sun-baked guano. Even at night, the Sooty Terns continue to call and wrangle.

After the breeding season, these thousands of birds disperse across the ocean, but just where, nobody knows for certain, and their migrations have been called 'one of the great unsolved mysteries of the sea'.

The single egg is laid almost anywhere the bird can find room: on the bare sand, beneath the shelter of a tussock or bush, or in amongst the beach grasses. The egg colour varies considerably, some being white, others having a pinkish tinge. Some eggs are slightly marked, some are quite plain, while others are variously patterned in reddish-brown, chestnut and lavender, and sometimes zoned at the larger end. Breeding seasons vary in different localities, from about September to May.

The Black-naped Tern, *S. sumatrana*, is a pale bird with a narrow black collar on the back of its neck. They frequent the seas and the islands of the Great Barrier Reef and northwards to the Torres Strait. Usually seen in the company of other species of tern, these delicate birds fish in the typical tern manner, hovering, and flying over the water and plunging down upon their prey.

Their nesting colonies are often mixed with those of the Roseate Tern and are found on coral islands throughout the bird's range.

Two eggs are laid as a rule, on the bare sand or coral fragments, just above the high water mark. The eggs are white or creamy, blotched with black, purplish-brown and underlying markings of lavender. They breed from September to December in this country.

The Bridled Tern, *S. anaetheta*, is an apparently black and white tern in the field with a black cap and nape and a white forehead, thus it may easily be confused with the Sooty Tern. The distinguishing marks to look for are a narrower white forehead in the Bridled Tern and the extension of this white well behind the eye as an 'eye-brow'. The underparts are not as purely white as in the Sooty, but this is not always apparent.

Bridled Terns are found around the northern coasts of the continent: in the west they penetrate as far south as Hamelin Bay, and on the east coast down to the islands in the Bunker Group and Lady Elliot Island, Queensland.

It has the local name in the islands of 'dog tern' because of its high yapping cry which sounds rather like a puppy. They are usually seen in scattered flocks, fishing the waters in the vicinity of their breeding islands.

These birds tend to lay their eggs in more sheltered positions than most other terns. The nest is a depression in the sand concealed under a tussock or bush. Sometimes the single egg is laid in a rock crevice or in the gap between two boulders.

Quite often they nest on the same islands as the sooties, but are noticeably shyer, flying off at the approach of an intruder. September to January is given by some authorities as the nesting season. This is probably in the east, as Serventy records that these birds commence nesting in the latter part of November and the eggs hatch after mid-January.

There is a good deal of variation in egg colour—as with most terns—white to stone-coloured backgrounds with chestnut and grey markings are typical.

The last Australian species in the genus *Sterna* is the Roseate Tern, *S. dougalli*. This is an almost world-wide species, being found in northern America, Europe, Africa and Australia. Its range in this country is from just north of Fremantle in Western Australia, along our northern coasts to eastern Queensland.

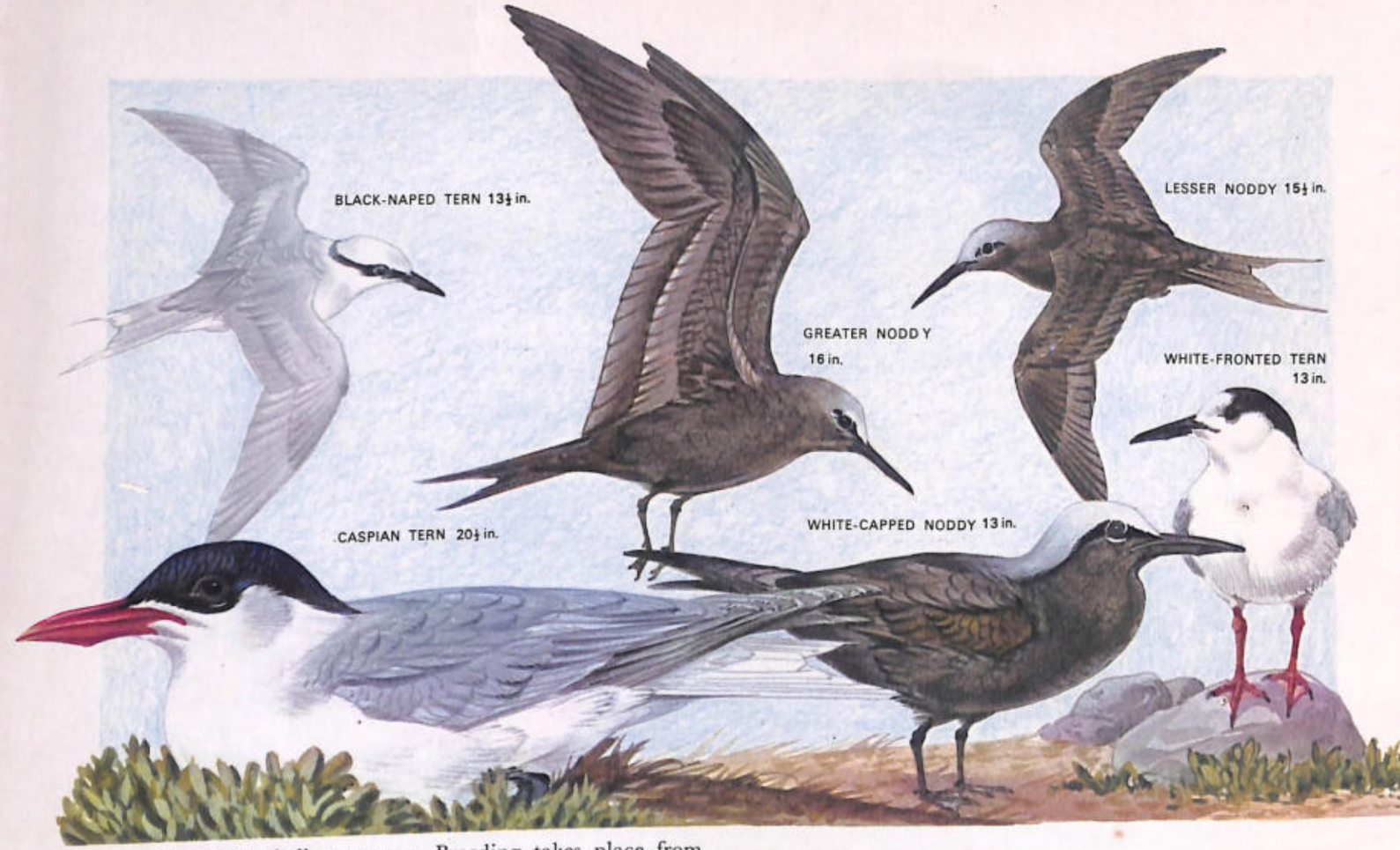
They nest in this country on off-shore islands, chiefly in tropical or sub-tropical seas. Although they frequent the waters in the vicinity of their breeding grounds, they will also visit nearby salt-marshes. Their food is chiefly fish, but they presumably take other food from marshy country.

This tern is considered an extremely graceful flier, even amongst terns. The pale rosy hue on the underparts, which does not show in a poor light, will distinguish it from any other tern.

They breed in colonies on various islands throughout their Australian range. However, Roseate Terns also breed in the other countries which they inhabit—chiefly in tropical areas.

The two eggs are laid in a depression in sand, shingle or coral fragments. Contrary to the behaviour of most terns, this bird will sometimes decorate and line its nest with

ROSEATE TERN
16 in.
LITTLE TERN
10½ in.
FAIRY TERN 10½ in.
CRESTED TERN
17 in.
GULL-BILLED TERN
17 in.
LESSER CRESTED TERN 16 in.
WHITE-WINGED BLACK TERN 11 in.
Summer
WHITE-WINGED BLACK TERN 11 in.
Winter




small pebbles, shells or grass. Breeding takes place from September to January.

Of the four Noddies in this country, three are in the genus *Anous* and are fairly common. The fourth is separated in the genus *Procelsterna:* this is the Grey Noddy, *P. cerulea;* a rare wanderer to this country, it is dealt with at the back of the book.

The Greater Noddy, *Anous stolidus*, is found along the coasts of mid-western, northern and north-eastern Australia. A few have been recorded from further south to such places as Kiama, N.S.W. This is a widely distributed tern found in many tropical and sub-tropical seas apart from those around Australia.

They may be seen in very large flocks, frequenting the seas adjacent to their breeding islands. The diet of these terns is mainly small fish, caught from on, or near, the surface. Much of their fishing is done on the open sea beyond the barrier reefs.

This bird and the Lesser Noddy are the only two marine terns that construct any real nest. The Greater Noddy builds in the low bushes growing on its breeding island. The nest is trampled down twigs and leaves in the top of a bush, often reinforced or decorated with pieces of seaweed. It is interesting that, whilst these terns are incubating their eggs, they make frequent trips to the beach for pieces of weed. As soon as the eggs hatch, the collecting ceases. Some noddies do not bother about a nest but lay their eggs amongst the samphire or on the bare ground in a shell-decorated scrape.

As with some other terns, these birds show great disregard for Man, sitting tight and sometimes allowing themselves to be touched. A continuous clamour goes up from a colony and the scene is one of great animation, as birds wheel overhead and fly back and forth from the sea to their nests.

The egg varies considerably, both in colour and shape, a typical egg being dull white or buffy-white with spots and blotches of purplish-brown.

# COLUMBIFORMES

## Pigeons and Doves

This family has its greatest development in the Oriental and Australasian regions. Pigeons have an easily recognisable form, despite the great disparity between the species in size and colour. They are popular as domestic birds and many fantastic breeds have been developed.

Strictly speaking, the terms pigeon and dove have no particular scientific meaning: the application of one or other name is largely a matter of precedent and usage. In practice, the larger, more heavily built birds tend to be called pigeons, and the delicate, long-tailed species are given the name dove.

A unique characteristic of Columbiform birds is their ability to suck up water through their bills. Other birds have to take a sip and tilt their heads back to get the water down.

Included in this family is the Dodo, now extinct and known only from remains discovered on the island of Mauritius, and from drawings by early mariners.

There are twenty-six pigeons and doves in Australia, including two introduced species. Genetically they are very divided, nearly half the species being in genera of their own.

Australian Columbiform birds may be roughly divided into ground-frequenting or tree-frequenting birds; although some species may be seen equally in either situation.

GREEN WINGED PIGEON 9½ in.

The tree-frequenting, or fruit-pigeons will be dealt with first. It will be noticed that the word *phaps* occurs a good deal in the scientific names of these birds; this is simply the Greek word for pigeon.

### FRUIT PIGEONS

The Rose-crowned Pigeon, *Ptilinopus ewingi*, is a small, brilliantly coloured pigeon of tropical northern Australia; its range also extends to Timor and Flores. Its distribution in this country is coastal, north-western Australia and the north-east of the Northern Territory. In spite of their brilliant colouring they are difficult to see as they sit amongst the thick tropical foliage.

These pigeons feed on the berries, and other fruit of various trees, and are usually found in the vicinity of such growth.

The nest is a slight and loosely built platform — a typical pigeon's nest — placed in the branches of a tree. It is usually built eight or ten feet from the ground.

One white egg is laid and the breeding season is from October to February.

The Purple-crowned Pigeon, *P. superbus*, has a most appropriate Latin name, as it is a very handsome bird with its lime-greens, russet, purple and pink plumage. Its range is much more extensive than the foregoing bird and in spite of it looking so tropical, it is found from south-eastern Victoria (occasionally), all the way up coastal eastern Australia. It is even recorded as a rare accidental visitor to Tasmania.

This pigeon is similar in its habits to the other species of *Ptilinopus*. Its call note is a series of 'ooms', drawn out and slowly repeated.

A small twig platform, only about three inches across, suffices for a nest. This is constructed in the horizontal fork of a tree; usually about ten feet from the ground. The nesting site is usually on the open edge of scrub or forest.

One white egg is laid and the breeding season is from October to February. This pigeon is also found in New Guinea and other islands to our north.

Red-crowned Pigeons, *P. regina*, are also eastern Australian birds, but come from the north. Their range extends only rarely to eastern Victoria. It is considered to be a wind-blown accidental visitor to Tasmania. This pigeon frequents a variety of habitats. It may be seen in coastal brush country, forests and mangrove swamps. Like the others of its genus it is a very handsomely coloured bird. It is none the less difficult to spot in the depths of a tree or bush and it is more often heard than seen. The call note is a loud 'coo' repeated a number of times. Each set of calls starts slowly and becomes more rapid before dying away again.

This pigeon is a fig eater and also takes other berries and fruits.

A slight platform of sticks is put together to form a nest, which is usually about six inches in diameter. It is placed in the branches of a scrubby tree and is usually high up, unlike the nests of its two relatives.

One white egg is laid and the breeding season is from October to February.

The Topknot Pigeon, *Lopholaimus antarcticus*, is found in eastern Australia from Cape York to north-eastern Victoria. It is a rare visitor to Tasmania. Sometimes it is listed as accidental to that island, but the dozen or so that were seen in 1963 do not sound particularly accidental. They visited the fruit-growing district of Spreyton, and some were shot as they were raiding cherry trees.

These large pigeons usually travel in flocks and are nomadic in their habits. Their movements follow the wave



BANDED PIGEON 14 in.

of ripening fruit and seeds, and they are particularly attracted to the seeds of bungalow and cabbage-tree palms.

Until the birds were protected, they were shot in considerable numbers by early settlers, and made good eating. In autumn and winter they congregate in huge flocks and travel in search of food.

These pigeons usually keep to the tops of high trees unless they are coming low to feed. Their call is a kind of snorting.

The nest is a platform of good-sized twigs built in the high, thin branches of a tree at heights of up to one hundred feet. One white egg is laid and the birds breed between October and December.

The name of the Wompoo Pigeon, *Megaloprepia magnifica*, is suitably onomatopoeic. Its extraordinary call sounds like 'wom-wom-poo' or 'bok-bok-oo' and, has also been likened to the sound of a domestic turkey's gobbling cry.

Seen in pairs or small flocks, and heard more frequently than seen, this pigeon is a bird of the coastal scrub. It is usually found in the vicinity of fruit and berry-bearing vines and shrubs.

The Wompoo Pigeon is an extremely handsome bird with a breast of wine-coloured 'velvet' and a livery of golden-yellow, green and grey. In spite of the lively colouring, this pigeon, like the other fruit pigeons, is difficult to find. Adding to the difficulty, is the echoing, almost ventriloquial quality of the bird's booming notes.

The nest is a small and compact plate of curled up vine tendrils. This is built on a thin branch of a tree at heights up to sixty feet.

Its range is from New Guinea down the coast of eastern Australia. Some records state 'as far south as eastern Victoria' but the '*Handlist of the Birds of Victoria*' (Wheeler) does not include it.

The White-headed Pigeon, *Columba leucomela*, is the only species in this country that bears the name *Columba*, indicating that it is a 'true' pigeon and of the basic pigeon stock from which other varieties of pigeon have evolved.

It is a bird of eastern Queensland and eastern N.S.W. sometimes being seen as far south as the Illawarra district.

These pigeons are wanderers, their movements being governed by the local ripening of native fruits and seeds. In pairs or in small flocks, these pigeons are chiefly inhabitants of the coastal scrub country. They favour the seeds of the cabbage-tree palm and the bungalow palm: inkweed berries are also eaten freely.

The call-note is a loud 'whoo-whoo' repeated a number of times. One white or creamy-white egg is laid and the breeding season is March to October. A flat nest is built of sticks, high in the branches of a jungle tree or in a vine-tangle.

Nutmeg Pigeons, *Myristicivora spilorrhoa*, are birds of the north. Their range extends through New Guinea, the Aru Islands, Torres Strait and so down to Australia.

It migrates to this country and may be seen from the Kimberley area in north-western Australia, to Port Denison in Queensland.

They arrive in flocks during September and October and fly north again in March and April. The chief breeding and roosting grounds of these pigeons are the off-shore islands, and they come across to the mainland each day to feed. Their diet is mature berries and fruits of such trees as the quandong and the wild nutmeg.

Whilst the egg is being brooded in the nesting season, the

bird 'off duty' flies to the mainland each day and returns with its crop full of food for its sitting mate.

Like the Topknot Pigeon, this bird used to be persecuted a great deal by shooters: it is now completely protected.

The nest is an insubstantial collection of twigs laid across each other in the fork of a tree, often a ti-tree or a mangrove. One white egg is laid and the breeding season is from October to January.

Banded Pigeons, *Leucotreron alligator*, are rare and apparently local birds which have only been located in the Alligator River area of Arnhem Land in the Northern Territory. This handsome bird has only been seen by a few people and its habits are largely unknown. It is said to feed on fruit and berries like the other fruit pigeons and has been seen in the sandstone areas on the tributaries of the river. The call is a deep booming and a noisy whistling sound made in flight, which may be made by the birds' wings.

The Brown Pigeon, *Macropygia phasinella*, is found in the Northern Territory, eastern Queensland and down the coastal scrub to south-eastern New South Wales. This pigeon's range also extends to New Guinea and the Philippine Islands.

In pairs or small flocks they frequent the more open areas of coastal scrub, and may be seen in clearings and along bush tracks, feeding on various native fruits.

The chief diet of this handsome brown bird consists of the berries of wild tobacco, inkweed and wild raspberry. Most of its food being obtained on the ground, it is less arboreal than all the preceding species and might be considered rather similar in its habits to the next group of pigeons.

The nest is a typical pigeon-platform of twigs, criss-crossed in a tangle of vine or in the branches of a tree. As a rule the nest is low but some may be found up to fifty feet from the ground. The egg is creamy-white and laid at a variety of times: a typical breeding season is from October to December.

## GROUND PIGEONS

These pigeons and doves are mostly ground feeders, taking seeds and fruit from grasses, low bushes and vines. Some of them live their lives almost exclusively on the ground. Others roost and nest in trees, but none the less spend a large part of their lives on the ground.

The Peaceful Dove, *Geopelia placida*, is found generally throughout the country in suitable localities. These delicate little birds are often seen sunbathing, with one wing up, along the dusty borders of country roads and they also frequent farm buildings: otherwise their habitat is the open forest. They feed on the seeds of various grasses and other plants, but may be seen perching in trees quite frequently. The call of this dove is a traditional melodious cooing, syllabised, 'doo-dee-oo'. A scanty platform of twigs suffices for a nest, and this is usually on the horizontal fork of a tree up to twenty feet from the ground: occasionally the old nest of a mudlark is utilised.

Two white eggs are laid, and these are often quite visible from beneath, gleaming through the frail nest. The breeding season is usually from September to January but can be later in some areas.

The Diamond Dove, *G. cuneata*, is a similar bird to the one above but may be distinguished by the white spots on its wings. It is distributed about Australia as a whole, except coastal South Australia and the south-east. This dove is considered to be uncommon in the south-west.

This little bird becomes quite tame if in contact with humans and feeds fearlessly about homesteads. In pairs or small parties they frequent permanent water-holes and rivers where they feed on the seeds and small fruit of various plants. This species is red about the eye where the Peaceful Dove is pale green. A light structure of twigs is built low in a tree or sometimes the birds nest on the top of a stump. Two white eggs are laid and the breeding season is from September to December or later in some areas. The bird has a typical 'dove-like' call, a plaintive 'whoo-whoo-whoo', with the accent on the first and last syllable.

Bar-shouldered Doves, *G. humeralis*, are found from north-western Australia, across 'the top' and down eastern Australia to N.S.W.; a few reach the Sydney area. This dove is also found in New Guinea. They favour mangroves when inhabiting coastal districts, but are also found in big scrub well inland. These doves are ground-feeders, where they search for the seeds of various plants and native fruits.

The call is loud and is described variously as 'hop-off,

hop-off' or a penetrating 'olly-wattle'. Just as the sun is setting, these birds become very vociferous, almost irritatingly so at times.

Nesting is in the usual dove manner: a frail platform of twigs, through which one can often see the two white eggs. The nest is usully built in a low bush or tree, in mangroves near the beach, or otherwise in thick scrub. The breeding season is variable but typically from August to March.

We have two introduced doves in this country. The Indian Turtle-dove, *Streptopelia chinensis*, has spread as far as north-eastern Queensland, N.S.W. and Victoria where it is mainly coastal, and to Tasmania. They are also found in southern South Australia and the far south-west of the continent. This widespread distribution is from various batches banded at different places from 1870 onwards. The Western Australian population started in 1898 from the Perth Zoo. In 1912 some of these doves were brought direct from India and released in Queensland. They have spread rapidly, being catholic in their habitat requirements and are familiar birds both in the bush and in suburban gardens. On the whole they appear to be fairly harmless although bothering vegetable growers in a few districts.

Their call is a typical 'cooing'. A normal dove-nest is built of sticks in a tree or bush at various heights. Their breeding season is almost throughout the year in mild climates but tends to be from October to January.

The other introduced pigeon is the Senegal Turtle-dove, *S. senegalensis*. These birds are confined to Western Australia and the original stock were released from a Perth Zoo in 1898. On the whole, it has not spread very far from Perth although colonising country areas more than the Indian Turtle-dove. Somehow, isolated populations have established themselves at Kalgoorlie and Esperance.

The nest is the usual flimsy structure of sticks and twigs. As with the Indian Turtle-dove, this bird's nest becomes cemented together with the bird's droppings as brooding progresses. Two white eggs are laid at almost any time of the year, but mostly during the spring and summer.

The Brush Bronzewing Pigeon, *Phaps elegans*, is distributed from Fraser Island (off Queensland) down coastal eastern Australia to Tasmania and across to the Eyre Peninsula in South Australia. In Western Australia, it is confined to the south-west, as far north as the Abrolhos Islands.

These are not flocking pigeons but are usually seen in pairs or sometimes singly. They inhabit coastal scrub and heath and spend much of their time on the ground. They are able to run very fast and usually escape detection in this way rather than flying. If disturbed suddenly, a Bronzewing will take off with a clatter of wings, but usually lands again to run off into the scrub.

The call is a low, rather mournful cooing, heard frequently in the evening. These handsome pigeons are much less common than they were fifty years ago, probably due to the depredations of foxes and cats, as the birds' range coincides with the more settled areas of the country.

The nest is the usual pigeon-platform of sticks, although somewhat saucer-shaped. It may be placed in almost any low situation: the branch of a tree, in a thick bush, on a stump or even on the ground under cover. The fledglings and sitting adults are thus an easy prey for foxes and cats.

Two white eggs are laid, usually between October and January, although this varies.

The Forest Bronzewing, *P. chalcoptera*, is a rather similar bird that is found throughout most of Australia and Tasmania where suitable habitats permit. This pigeon may be distinguished from the foregoing species by its white forehead and the white chin and under-eye stripe.



Forest Bronzewings are birds of the open forest and brush country. Usually in pairs, they spend most of their time on the ground. They will run off and hide if given the chance, but if flushed suddenly they rocket off with a very startling rattle of wings. These pigeons have the habit of landing in trees after a flight, to watch the intruder, and will often allow a close approach before flying off again. The wing-clapping take-off would seem to be some kind of an alarm signal, as they are quite able to rise from the ground and fly way comparatively quietly.

The call is a low 'ooom' monotonously repeated. In Western Australia this Bronzewing was apparently decreasing until about 1934. About this time a population expansion started which is continuing to-day, and the pigeons are seen where once there were none. It may be that these pigeons are subject to extended cycles of fluctuation and diminution as some other species of pigeon are.

The two bronzewing pigeons have a disastrous effect if eaten by dogs or cats. The birds often feed on the seeds of a plant called the Box-poison, *Gastrolobium bilobum*. Their entrails and bones, but not their flesh, thus become poisonous. After eating these pigeons, dogs or cats take fits, become quite mad, biting at anyone within reach, and finally die in convulsions. The poison may affect foxes in the same way; in which case it would be a kind of natural retribution for the damage the foxes do to the bronzewing population.

The Wonga Pigeon, *Leucosarcia melanoleuca*, is found from eastern Queensland to eastern Victoria as far as Melbourne. These pigeons usually go about in pairs. They spend much of their time on the ground in rain forest country and thickly timbered gullies. If flushed, the bird will jump up with loud wing-clappings, but does not fly far before dropping into a tree or bush and sitting with its grey back to the observer. Its showy front being hidden, the pigeon relies on its dull colour to escape notice.

Wonga Pigeons will sometimes indulge in injury feigning, a practice one associates more with true ground-birds than a partially arboreal species like a dove.

There was a time, in the earlier days of settlement, when these large plump pigeons were shot in large numbers. Their flesh was considered excellent eating, but now they are entirely protected.

The call of this bird has great carrying power, and yet sounds to be uttered quite softly when one is close to the bird. The monotonous 'wonk-wonk-wonk' can sometimes be heard from half a mile off. It also has a kind of 'background' quality and the bird may have been calling for some time before one becomes aware of it. The 'wonking' is repeated many times; over one hundred in succession have been recorded.

Feeding mostly on the ground, the Wonga Pigeon eats the fruits of native plants and the seed of various grasses.

The nest is a barely concave platform of twigs placed in a tree up to thirty feet high. Two white eggs form a clutch and the common breeding season is from October to January but this varies a good deal and these pigeons may even be found breeding in the colder parts of the year.

The Green-winged Pigeon, *Chalcophaps chrysochlora*, is actually a fruit-pigeon if defined by its diet, but as this bird is also mainly terrestrial in its habits, it is included in the present group.

The distribution of this pigeon is along the coastal districts of the Northern Territory and eastern Australia, from Cape York to eastern Victoria where it is considered to be accidental by Wheeler (*Handlist of the Birds of Victoria*). Usually in pairs, these plump, green and cinnamon coloured pigeons frequent the coastal scrub and rain forest. They spend most of their time on the ground and are

often comparatively fearless. A close approach is tolerated before the birds burst up on loudly whirring wings. Usually they fly off rapidly for a short distance and then suddenly drop back to the ground, and disappear into the scrub.

The call is a drawn out cooing sound. These pigeons feed on grass seeds, and various native fruits.

A flimsy nest is built of twigs and a barely concave centre holds the two pale creamy eggs. A variety of nesting sites is used: it may be on a forked leafy branch, in the top of a fern growing out of a tree or tucked into a tangle of vines. The nest is usually no more than fifteen feet from the ground. These pigeons breed at almost any time of the year, depending on local conditions of weather and food supply.

The Crested Pigeon, *Ocyphaps lophotes*, is found throughout most of Australia except for the north-western, south-western and south-eastern corners of the continent.

This handsome bird, with its fine crest and bronzed wings, is a common pigeon and well known by most people in the country. As well as its wilder haunts, it frequents man-made dams and stock paddocks close to farmsteads. Otherwise, these pigeons can be seen in pairs or small flocks along timbered streams and other permanent water.

When disturbed from their feeding, these birds fly up on rapid wings that make a distinctive and unmistakable whistle. They do not go far, but soon perch in nearby trees, often a small flock will all land in the one tree, to eye the intruder. Their main food is the seeds of grass and other herbaceous plants.

The nest of this species is a typical pigeon-platform of a few twigs loosely laid together. It will usually be found on a leafy horizontal branch of a bush or tree, at heights up to twenty feet. Two white eggs are laid at practically any time of the year, depending on local conditions, although the spring and summer months are common times.

The Squatter Pigeon, *Geophaps scripta*, is mainly a northern bird. It is found from the eastern Northern Territory to Queensland, and the northernmost areas of N.S.W.

Once common, this pigeon must now be regarded as rare. The spread of settlement, disturbing its habitat, and earlier persecution by hunting, have reduced the bird and driven it from many old haunts.

These birds usually live in small flocks, and if flushed, go up with loudly whirring wings. The birds scatter as they fly and soon drop back into cover to hide. Squatter Pigeons inhabit the open plains where they spend almost their entire time on the ground. The diet of these birds is made up of the seeds of various grasses. They derive their name, not from taking over new territory—which they do only too little—but from the bird's habit of squatting for concealment when approached.

A true ground-bird, as is its relative treated below, the Squatter Pigeon lays its eggs in a scrape in the earth. A few dried leaves and dead grass are used to line this hollow and two creamy-white eggs are laid. September to January are common breeding months, but this varies to suit local conditions.

In the same genus as the foregoing bird, the Partridge Pigeon, *G. smithi*, is found from the Kimberley area to western Queensland. It is usually seen in small groups in open country. Grass plains near water appear to be this bird's favourite habitat.

Grass seeds of various kinds form this pigeon's diet and it is amongst the grass that it spends most of its time: it is only very rarely seen in trees.

The nest is a shallow scrape in the earth lined with dried grass and usually under the shelter of a tussock or low shrub. Two creamy-white eggs form a clutch and the breeding season is mainly from August to October.

The Flock Pigeon, *Histriophaps histrionica*, is confined to the northern parts of Australia: extending south to Minilya River in Western Australia, north-eastern South Australia and north-western N.S.W.

These pigeons are nomadic, following the seasonal ripening of the grass seeds upon which they feed. At various times since the settlement of this country, they have been reported in prodigious numbers, and at other periods they have become relatively rare.

They feed exclusively on the ground, and if flushed, the flock will take off with a great rush of wings, circle a few times and then land again.

A report about these birds from records made in 1900 indicates the size of some flocks. 'The pigeons were watering in countless myriads, flock succeeding flock, and the roar of their wings was like the noise of heavy surf on a reef.' And also ' . . . the flocks were greedily feeding in such numbers as to hide the ground'.

Since those early days, some years have been better flock-pigeon years than others, but there are no accounts of such large numbers. This could be due in part to droughts

and partly to the competition for grassland with cattle and sheep.

These pigeons nest on the ground, usually under the shelter of a tussock or scrubby bush. Two white eggs are laid as a rule. The birds will breed in any part of the year, being governed by the suitability of local conditions.

The Plumed Pigeon, *Lophophaps plumifera*, is found in the Kimberly area across the Northern Territory into central Queensland and northern N.S.W.

In pairs, or small flocks of half a dozen or so, these handsome reddish-coloured birds are found in rather dry, open country. Their favourite habitats are open plains dotted with stunted bushes and spinifex.

Like the other ground-pigeons they live on the seeds of various grasses including in the case of these birds, spinifex.

They are not nomadic, seldom moving far from some water-hole in their dry environment. When disturbed into flight, the birds take off with a considerable whirring of wings. This pigeon's call has been described as 'coo-rrr'.

Virtually no nest is made, the two white eggs being laid in a hollow on the ground. Sometimes the eggs are sheltered by a low bush or a clump of spinifex. It appears that more than one clutch is laid in a year. The breeding season may be at almost any time, but is usually after rain.

Western Plumed Pigeons, *L. ferruginea*, are very similar birds to the foregoing species. They are found only in north-western Australia, from Shark Bay to west of the Kimberley area.

They are very similar in habits to the Plumed Pigeon and the habitat is much the same: dry plains country with a little scrubby vegetation and spinifex. In spite of its redness —or rather because of it—these pigeons are well camouflaged in their surroundings. A flock may not be spotted until they leap into the air with a startling whirr of wings. The call is a loud 'coo' sound.

The nest is a hollow in the ground lined with a few dried grasses and usually placed in the shelter of a bush or spinifex. The two creamy-white eggs may be laid at any time after rains.

The White-quilled Rock-pigeon, *Petrophassa albipennis*, is another far northern pigeon, being found from the Kimberley area to western Northern Territory.

They are birds of the sandstone country as a rule and are a shy and secretive species. They are hard to flush, relying on their brownish protective colouring to escape detection.

They live in pairs or, out of breeding season, in small flocks.

If they are disturbed into flight, they go up with a loud whirr of wings. The birds only fly a short distance before pitching—often on to a bare rock from which they can watch the intruder. They feed exclusively on the ground, on the seeds of herbaceous plants and various grasses.

A slight hollow scraped in the earth and lined with dried grass, suffices for a nest, although it is usually under a small bush or sheltered by a tussock. Two creamy-white eggs are laid and have been noted as far apart as July and October, so nesting is probably at any time, depending on local conditions.

The Chestnut-quilled Rock-pigeon, *P. rufipennis*, is a bird confined to Arnhem Land in the Northern Territory. These pigeons frequent the sandstone hills and, harmonizing so perfectly with their surroundings, are very difficult to see.

The diet of this bird is similar to that of the foregoing species and neither its nest nor eggs have been found and described: no doubt they will prove to be similar to the other Rock-pigeon.



# PSITTACIFORMES

## Parrots and Cockatoos

There are about 316 species of parrots, cockatoos and allied birds in the world, of which we have roughly one fifth in Australia. These range in size from the two-foot glossy black Palm Cockatoo, down to the brightly-hued six inches of the Fig-parrots.

Ever since the first explorers came to Australia, the parrot family has been a source of interest and wonder to naturalists and laymen alike. Sir Joseph Banks remarked with delight on the various species of cockatoos and parrots

he saw and, on returning to England, took with him a rainbow lorikeet. This was the first Australian parrot to be brought alive to England, and oddly enough, is the first in the classification of our parrots.

Not unnaturally, such fascinating birds attracted the attention of artists — some of whom had never seen their subjects alive. Consequently, there are some very bizarre representations of our parrots in the early journals of discovery. These drawings were done from word descriptions, skins, and badly mounted specimens. However, some of the artists did rather better by working on the spot. In Grant's 'Narrative' of one of the voyages by H.M.S. *Lady Nelson*, there is a quite presentable coloured plate of a gang-gang cockatoo.

The Pink Cockatoo, otherwise known as the Major Mitchell Cockatoo, is another species that had at least one good portrait painted of it. This is one of the loveliest birds in Australia. Perhaps the earliest painting of it is a very beautiful plate for Sir Thomas Mitchell's *Three Expeditions into Eastern Australia*, published in London in 1838. Neville Cayley goes so far as to say that this is ' . . . an exquisite drawing, one of the finest of the species yet produced'.

As well as its other merits, the painting certainly has the proportions of the bird far better than most drawings of our birds done at that time.

Mitchell himself wrote of this cockatoo, 'Few birds more enliven the monotonous hues of the Australian forests than this beautiful species whose pink-coloured wings and glowing crest might have embellished the air of a more voluptuous region'.

John Gould was equally eulogistic about our parrots. 'Immense flocks of White Cockatoos are sometimes seen perched among green foliage of the loftiest trees; the brilliant scarlet breasts of the Rose-hills (Rosellas) blaze forth from the yellow flowering *Acaciae* . . .' And so it goes on, almost everyone who came into contact with our parrots marvelled at the variety of their form and colour.

Even to-day, with encroaching settlement reducing their habitats, there are still places where parrots may be seen to advantage. Clouds of budgerygahs, sometimes in their thousands, still come to drink at inland water-holes, and our forested hills still echo to the shriek of brilliant rosellas. Some of the group seem to have adapted very readily to human intrusion, and birds such as the galah may even have benefited by it. There are many places where the farmers have more cause to complain than eulogise, when hundreds of galahs flock down to feed on freshly seeded paddocks or ravage the growing crops.

White cockatoos also, have remained very common in some localities. It is quite an experience to arrive at a water-hole or billabong and interrupt a flock that has come to drink. Hundreds of the birds fly out from the trees, brilliantly white against the deep blue sky. The noise is quite extraordinary as they scream hoarsely at the intruders. For ten minutes or more they flap and wheel through the air or land in the trees, still screaming, to peer down at the humans below. One may even hear some harsh voice cry out 'Hello Cocky', or 'Cocky want a peanut?' as some escaped cage birds recognise the humans below.

Eventually they will settle down, and perhaps, if the water-hole is extensive enough, will resume their drinking and splashing at the other end from one's camp.

The first group in our psittaciform birds is the lorikeets. These brilliantly coloured parrots have a specially adapted tongue to enable them to reach down into eucalypt blossoms and other flowers, and extract the nectar. It is extensile and developed into a somewhat brush-like form. They are generally nomadic birds, following the 'honey-flow', the seasonal tide of blossom on eucalypts and other trees.

Gould has written ' . . . I scarcely believe that it is possible to convey an idea of the appearance of a forest of flowering gums tenanted by *Trichoglossi;* three or four species being frequently seen on the same tree and often simultaneously attacking pendant blossoms of the same branch'.

The cockatoos are the next group in the order Psittaciformes. These birds are almost entirely restricted to the Australian Region, being found outside it only in the Philippine and Sulu Islands. Australia might, therefore, more

SCALY-BREASTED LORIKEET 9½ in.

VARIED LORIKEET 8 in.



accurately be named *Terra Kakatoe*, than, as it has sometimes been, the Land of Parrots. We have eleven species divided between four genera. The four birds in *Calyptorhynchus*, are large blackish cockatoos, with coloured barring in their tails.

Our other black cockatoo is the Palm Cockatoo, placed in a separate genus. This imposing bird has a fine crest, a large patch of bare pink skin on its cheek (which blushes) and an enormously powerful bill. These cockatoos can crack nuts with ease in their great mandibles that would otherwise require hard blows from a hammer to open.

The Gang-gangs are in a genus of their own and are rather mysterious birds of the forest. The male has the whole of its head sharply defined in red, and a filamentous wavy crest.

The genus *Kakatoe* contains the white cockatoos, the best known of the group and favourites with many people.

The White Cockatoo, with its thick snowy plumage and fine sulphur-yellow crest, is often seen in captivity and, if treated well, makes a gentle and talkative pet. The age potential of parrots in the wild is considerable although most, no doubt, die 'before their time'. The longevity of captive cockatoos in particular is notorious. A White Cockatoo in Sydney appears to have held the world record. Known as 'Cocky Bennett', his age was estimated to be about one hundred and twenty years. For a considerable number of years before his death 'Cocky Bennett' was quite naked except for one or two head feathers. The shrivelled old bird would step up and down his perch screaming 'I'll fly! I'll fly! One more feather and I'll fly!'

There are three other white cockatoos and the pink and grey Galah in this group. The two corellas remain quite common but the Pink Cockatoo has become rare in many districts. To counteract this, however, the bird is increasing in certain restricted places such as Wyperfield National Park in the Mallee district of north-west Victoria.

Galahs are, in the opinion of some farmers, only too common. These very beautiful birds seem to have adjusted themselves to man's encroachment and turned it to their own advantage. Many cultivated areas support larger populations of these cockatoos than would probably be found in an equal area of virgin country.

They are not on the protected list and many are shot, although galah-pie does not enjoy the vogue that it did with earlier settlers.

Corellas—the short-billed and long-billed varieties—both take easily to captivity and are considered to be amongst the finest talking birds in the world, rivalling the Indian Hill Mynah and the African Grey Parrot.

The Cockatiel presents something of a taxonomic problem—reflected in one of its alternative names,' cockatoo-parrot'. They are extremely decorative, long-tailed little birds and very popular with bird fanciers and breeders. Captain Cook and a few companions were the first Europeans to record seeing this bird, in New South Wales. In captivity they will learn to say a few words and whistle a bar or two.

The Red-sided Parrot is considered to be a New Guinea bird with a range extending into Australia. They are unique amongst our psittaciform birds in having brighter females. The female bird is scarlet and a purplish-red, whilst the male bird is basically green. These large and handsome birds of the tropics were actually known first from an island called Amboyna, nearly two hundred years ago, but were only discovered in Australia in 1913. In spite of the considerable development of the bill of the Red-sided Parrot, it is not a nut-cracking bird, but feeds on various soft fruits such as paw-paws.

The Red-cheeked Parrot is another New Guinea bird that is also found in Australia. Like the foregoing species,

this parrot was also discovered in this country in 1913 by W. McLennon, a naturalist and collector of the time.

The Aprosmictus group comes next, with two birds that are basically red and green in plumage. The King Parrot is a bird of the thick brushes and forest country and to see the glow of these deep scarlet birds against the soft green of a eucalypt forest is a memorable sight. They are much less common than they used to be. Until prevented by law, bird-trappers took many of these highly saleable birds. Destruction of habitat, and the clearing of land for agriculture, has also reduced their numbers.

Its relative, the Red-winged Parrot, came under the notice of early visitors. Captain Cook's expedition collected specimens, interestingly, from near the coast: these days it is a bird which seldom, if ever, visits coastal areas in N.S.W.

These birds do not have the dash of most of the parrot tribe, but flap in a rather laboured manner through the tall timber.

To quote Gould ' . . . flight is performed with a motion of the wings totally different from that of any . . . Psittacidae I have seen, and has frequently reminded me of the heavy flapping manner of the Peewit, excepting the motion was even slower and more laboured'.

The Superb, the Princess and the Regent — are three rather grand names for the three very beautiful parrots making up the genus *Polytelis*. These are graceful birds with long tails, especially the central feathers, and streamlined bodies. The simplest in colour is the Superb; grassy green with a vivid yellow face and scarlet bib. The fate of these beautiful creatures has been the same as some other of our parrots. In the early days of settlement they were very common and popular as cage-birds. Once these parrots became known to English and European fanciers, large shipments of them regularly left our shores.

Regent Parrots are even more beautiful, and were well depicted by Edward Lear in 1831 in his work on the parrots. They are, typically, birds of the mallee and are interestingly woven into the story of Wyperfield National Park — a reserve of mallee country in north-west Victoria. This area was regarded as perhaps the principal breeding stronghold of these birds. But every nesting season it was heavily raided by professional and amateur trappers. When the area was made a national park, there was a good deal of local resentment—and a certain amount of trapping continued. Now, however, they have re-established themselves, and a more enlightened public is happy to watch these lovely birds without coveting them.

The third species in this group, the Princess Parrot (recently being called the Rose-throated Parrot) was discovered in 1862. This was at Howell Ponds on Stuart's south-north expedition, but these birds were not seen again until 1890, nine years after the death of Gould who had officially described the birds for science in 1863. The birds were named in honour of the then Princess Alexandra.

The rosellas are our largest group of parrots, with nine species. All of them are beautifully coloured, some being brilliant, like the Crimson and the Eastern Rosellas, and others such as the Pale-headed and the Yellow, are more subtle.

The Eastern Rosellas were popular birds in England very early, and great numbers of them were shipped over. Many rosellas also ended up as parrot-pie and were considered most tasty.

Amongst bird-fanciers the Crimson Rosella is known as Pennant's Parakeet and, with the foregoing species, is one of the most popular aviary birds in Europe and England.

The genus *Barnardius*, contains four species of greenish-coloured parrots with yellow collars. Two of these are eastern birds with green crowns and the other two have blackish crowns and are found in the west of Australia. In spite of being 'only greenish' these birds are very handsome when seen feeding in the bright sunshine. Gould says of the Mallee Parrott: 'To see Barnard's Parakeet in perfection and to observe its rich plumage in all its glory, the native country (habitat) of the bird must be visited . . . the brilliant hues of its extended wings and tail show very conspicuously as it passes from tree to tree amidst the dark masses of foliage . . . ".

Wherever species of ringnecks come into contact with gardens, orchards and other cultivation, they are extremely unpopular, as they are so destructive. One irate land-owner, writing to the naturalist Charles Barrett, says: 'All I could, tell you about the twenty-eight Parrots (*Barnardius semitorquatus*) would hardly be natural history, but it certainly would be natural hate, as the birds are extremely destructive. One year they tore all the flowers of subterranean clover to bits on a small area . . . They nip off and leave many buds and flowers in our garden, and roses around our verandah; they make a great mess of hay in stooks in the paddocks . . .'. Considering their depredations, it is no wonder that many are shot; however, these parrots appear to be holding their own as species in their relationships with man.

The next parrot in the order is the Red-capped Parrot with the rather grand and tongue-rolling generic name of *Purpureicephalus*.

Gould considered this parrot 'most remarkable' in its difference from any other parrot in the matter of colour: the combination of wine-red, acid greens and purplish-blue is certainly a rich and unusual combination.

First discovered to science by Peron—a naturalist on Baudin's French expedition of 1801–4—this parrot was not officially described and named until 1820.

These birds, which are confined to south-west Australia, have a particularly long and hooked upper mandible. This is used by the birds to prise the seeds from the hard woody 'gum-nuts' of the Marri Gum. There is a close relationship between the distribution of this tree and the bird, and the Red-capped Parrot is probably the only species that is able to get at the Marri seeds. Gould also noted that the birds 'loved to feed upon the kernel of the native pear (xylomelum) when the fruit opened under the summer sun'.

The genus *Psephotus*, containing eight species, is almost as large as the Rosella group. On the whole these birds tend to be ground-feeders, eating the seeds of grasses and other herbaceous plants.

The commonest of the *Psephotus* is, no doubt, the Red-backed Parrot. These birds may frequently be flushed from the sides of country roads and are found in suitably grassy country throughout the unsettled and lightly settled areas of N.S.W., Victoria and South Australia. Gould considered that the bird had a 'decided preference for open grassy valleys and the naked crowns of hills, rather than to the almost boundless plain'. However, I found them quite common on the gently rolling country between the Murray and the Murrumbidgee rivers—a landscape that could hardly be called hilly.

In winter they gather in large flocks and may perhaps be seen, early in the morning before they start to feed, perched shoulder to shoulder along the branches of their roosting tree—usually a large dead gum tree.

Included in this genus are the three species (or, as some consider, forms) of Blue-bonnet: the Little, the Yellow-vented and the Red-vented.

Another interesting bird in this group is the Paradise Parrot. It was discovered by Gould in 1845 but gradually became more and more rare, until it was thought to be extinct.

Paradise Parrots were re-discovered, however, in the early twenties, and found to be nesting. These parrots must have been barely holding their own, for now they are on the doubtful list again. Most naturalists hold high hopes that these beautiful birds will still be found in N.S.W. or southern Queensland—rare, but not extinct. Expeditions are mounted now and then, to search for this elusive bird, on the strength of unconfirmed reports.

The Golden-shouldered Parrot is another rather rare, or at least, localised, bird, confined to northern Queensland. Hooded Parrots, like the previous two species, nest in a tunnel bored into a termite mound. This is another northern Australian bird, and it would seem likely that the range of these three parrots would be restricted—to some extent at least—by the range of the termites that build large mounds,

The genus *Neophema* contains seven species of small, rather delicately built parrots that are typically ground-feeders. Most of them have become uncommon, largely through the destruction and alteration of their habitats. This alteration has been brought about largely by the heavy stocking of the country with sheep and cattle. Rabbits denude the earth of what the stock don't take, and the seeding grasses and low shrubs, which are food and shelter

PALM COCKATOO
25 in.
RED-TAILED BLACK COCKATOO 24 in.

to these parrots, are cleared from large tracts of land.

Trapping has also contributed in the past to the reduction of some species of *Neophema*. The Bourke Parrot in particular is a favourite with bird fanciers, with its subtle greyish-brown, dusty-blue and pink plumage.

The Orange-breasted Parrot is another delicately coloured species that was once common but is no longer. These birds have not been seen in many of their old haunts for over fifty years.

Blue-winged Parrots were once common in south-eastern Australia and Tasmania, and Gould wrote of them, 'It runs over the ground and threads its way amongst the grasses with the greatest facility, and the little flocks are usually so intent upon gathering the seeds, as to admit of your walking close up to them before they will rise'.

The Elegant Parrot has resisted the advent of the white man rather better than some other *Neophema* species, and is still relatively common over parts of its range. But even these have declined; it is no longer possible for a naturalist to write, 'Flocks were constantly rising before me while traversing the salt-marshes, which stretch along the coast from Holdfast Bay to the Port of Adelaide . . . when disturbed, they retreated to the thick *Banksias* that grow on the sandy ridges . . . in such numbers, that I have seen those trees literally covered with them . . . '.

Turquoise Parrots became very rare due to the depredations of bird trappers; although this is now illegal, it is unlikely that this parrot will ever regain its numbers as its habitats are being invaded more each year. Trappers having wrought such havoc amongst the birds, it is strangely ironical that these parrots will no doubt remain common as an aviary species even if they become extinct in the wild. They breed freely in captivity and large numbers are reared in Australia and other countries.

It was Gould again, who first described to science another *Neophema*, the Scarlet-chested Parrot—or Splendid

YELLOW-TAILED BLACK COCKATOO 26 in.

Parrot, as it was then called. These birds live in dry terrain such as mallee or salt-bush and spinifex country. The type specimen which Gould described came from Western Australia in 1840. One of Gould's collectors, named Drummond, also sent 'several fine specimens' in 1845. This same Drummond, whilst collecting for Gould's works on the fauna of Australia, was 'treacherously murdered by a native in his company'.

An unusual bird in its nesting habits, the Rock Parrot breeds in holes in cliffs or other rocky situations. It is a coastal bird and was once found in large numbers on various offshore islands around our southern coasts.

Charles Barrett writes of visiting Goat Island, in 1909, a limestone island of less than two acres at the eastern end of the Great Australian Bight. 'As the boat drew near, a shot was fired, and a minute later the air was thronged with Rock Parrots. From behind the 'pig-face' (*Mesembryanthemum*) draping the rock ledges they appeared in hundreds . . . '.

Placed in a genus by itself, the Swift Parrot is well named. Its flight is indeed remarkably rapid and its long narrow wings *are* rather swift-like in form. They are bright greenish birds but, as Gould notes, their hue ' . . . so closely assimilates in colour to the leaves of the trees they frequent, and they moreover creep so quietly yet actively from branch to branch, clinging in every possible position, that it would be difficult to perceive them without minute examination of the tree . . . '.

The Budgerygah, again in its own genus, is too well known to need much description. Their natural colour is green and yellow with blackish markings but many varieties have been bred by aviculturalists.

The Budgerygah was discovered in the early 1800's around Parramatta, N.S.W. They are basically a parrot of the inland, but visit coastal areas periodically. In huge flocks, they may be seen coming to water-holes in the dry interior. They are still common, although perhaps not to the extent suggested by Charles Barrett's experience some time ago. They flew in ' . . . such vast numbers that they seemed to darken the sky as they came . . . Soon after sunrise, large flocks of Galahs, Budgerygahs and other parrots were already present at the water-hole, and thousands were arriving every minute . . . it was estimated that when the last flock had departed more than one million of these noisy little birds had been lured from far and near to the only drinking place for many miles around'.

The Ground Parrot or Swamp Parrot, as it is now being called, is a rare and unusual parrot that spends most of its life on the ground. It is found in swampy areas with thick reeds and other cover or otherwise in rather barren sandy terrain scattered with tussocky grass and other rank herbage. This bird is a great runner and rarely takes to the air. Gould says ' . . . From the strong scent it emits, dogs . . . point as dead to it as they do to ordinary game birds . . .' Its flesh is excellent, being delicate in flavour, and equalling, if not surpassing, that of quail and snipe.

Night Parrots are even more rare, and may, in fact, be extinct. Hopes, perhaps forlorn, that it may yet exist in some remote arid spot, have not been quite abandoned. It was reported in 1937, but not confirmed, in Western Australia in a sandy spinifex terrain far from habitation.

They live and nest amongst the tussocky porcupine grass and lie up inside a clump throughout the hours of daylight. As darkness falls they fly off to the nearest water-hole and then spend the remainder of the night feeding.

Some time before the doubtful Western Australian report, the naturalist Whitlock went searching for this lost parrot in Central Australia. He came frustratingly near to success. The feathers of a bird were found that had recently been eaten by the local natives.

## LORIKEETS

The Rainbow Lorikeet, *Trichoglossus molluccanus*, is found throughout eastern Australia, from Cape York to Victoria and Tasmania. These birds are usually seen in flocks. They are nomadic to a large extent, following the seasonal flowering of the eucalypts and other blossoming trees. They are swift fliers and have a loud, sharp call-note which they utter whilst on the wing. As these beautiful birds clamber amongst the blossom-laden branches, they keep up a continuous high-pitched chattering and screeching. The tongue

CORELLA
17 in.
SULPHUR CRESTED COCKATOO 20 in.
LITTLE CORELLA
17 in.

of these lorikeets is developed at its tip into a kind of brush, enabling them to extract nectar from blossoms with great efficiency.

There are cases of this species having become very tame —even to the extent of feeding out of people's hands.

In some districts this bird has become a considerable pest, raiding fruit crops of various kinds, and vineyards.

The nest is a hole in a tree where two white eggs are laid. The breeding season is typically from September to January.

Red-collared Lorikeets, *T. rubritorquis*, are similar-looking birds distinguishable by the red collar on the nape compared with the yellowish-green collar of the preceding species. This parrot is found in north-western Australia, the Northern Territory and northern Queensland.

They travel in flocks of various sizes, sometimes in considerable numbers in good flowering seasons. The voice of these birds is similar to that of the Rainbow Lorikeet. Its habits are also much the same, although it does not have a bad name as an orchard raider—perhaps more through lack of opportunity in its wilder haunts, than through any lack of propensity.

The nest is a hole in a tree, either in the trunk or in the 'spout' of a broken branch. The nest-hole is usually high above the ground.

The breeding season is from May to December, and two white eggs are laid.

Scaly-breasted Lorikeets, *T. chlorolepidotus*, are found in north-eastern Australia from the Cape York Peninsula down to the environs of Sydney and a little below. This is a parrot of the open forest and, since settlement, of cultivated areas. It has a bad name amongst orchardists and other agriculturalists. These birds are nomadic, following the 'honey-flow' of the flowering eucalypts, and other blossom-bearing trees. They are often seen in the company of the other two members of their genus. Like the two previous species, the tongue of this parrot is brush-like at the tip, thus enabling it to efficiently raid the gum flowers.

The Varied Lorikeet, *Psitteuteles versicolor*, is placed in a genus by itself, but is nonetheless a brush-tongued lorikeet. It is found across the top of northern Australia from the Kimberleys in the north-west to Townsville on the Queensland coast.

These birds move about the countryside in flocks and frequent areas where the eucalypts and ti-tree are flowering. The food of this bird appears to be exclusively the nectar it obtains from flowers. Its flight and call notes resemble those of the next bird, the Musk Lorikeet.

Four white eggs are laid in a hole in a tree-trunk or branch, and the breeding season is from May to January.

The genus *Glossopsitta* contains three parrots. The first of these is the Musk Lorikeet, *Glossopsitta concinna*. These small, rather chubby parrots are coloured in various greens and they, like the other lorikeets, congregate in flocks. These gatherings are particularly large in summer and autumn. In screeching companies, they descend upon the flowering trees, moving about the flower-laden branches quickly and thoroughly, often clinging and swinging upside-down in their efforts to rob the blossoms of their nectar. Whilst they feed they keep up a constant chattering that has been described as ' . . . little gurgles of satisfaction'. As implied by their name these small parrots do possess a musky odour.

As well as their natural, wild food, the Musk Lorikeets have learned to raid orchards and other cultivated fruit crops, where they sometimes do considerable damage.

The nest is usually high up and in a hole in a tree-trunk or the hollow 'spout' of a broken branch. Two white eggs are laid and the breeding season is from August to December. Musk Lorikeets are found from eastern central Queensland down to Victoria, Tasmania and south-eastern South Australia.

The Purple-crowned Lorikeet, *G. porphyrocephala*, is confined to the southern regions of the continent. Its range extends from Victoria (sometimes over the border into N.S.W.) to southern South Australia and Kangaroo Island. Separated by the arid Nullarbor Plain from the eastern birds, there is a western population found in southern West Australia.

Like its relatives, this is a flocking species which follows the seasonal flowering of the eucalypts and other blossom-bearing trees. These birds are swift fliers and have a variety of loud screeching notes uttered whilst on the wing.

A flock of these birds is a lively sight as they work their way busily through the tree-tops, their purplish crowns making splashes of colour amongst the more delicately coloured blossoms and grey-green foliage. As they feed, swinging and clambering about the branches, flowers come tumbling down that have been torn off in the birds' impatience to get at the nectar.

These birds, like the other lorikeets, have developed the unfortunate habit of raiding orchards and other cultivated fruit.

The nest is a hole in a tree trunk or branch. Four white eggs are laid and the breeding season is from September to November. Observations made in Western Australia show that incubation is undertaken entirely by the female. However, in the morning and evening when she leaves the nest to feed, she is escorted to and from the nest by her mate.

The third parrot in this genus is the Little Lorikeet, *G. pusilla*. This bird is found down eastern Australia from Cairns to Victoria and Tasmania, and westwards to Yorke Peninsula in South Australia.

In some localities this lively little bird is still known by its aboriginal name, *Jerryang*. They are remarkably fearless birds when intent upon feeding, and will clamber about the branches a few feet above one's head, busily feeding in the blossoms.

Typical of the lorikeets, they are usually seen in flocks, either flying swiftly overhead, screeching as they go, or feeding in the trees. They follow the honey-flow, coming and going as the eucalypts and other trees blossom. They are vociferous whilst feeding and work very busily through the flower-laden trees; the birds sometimes hanging as thickly as the blossoms on the branches.

## FIG-PARROTS

The fig-parrots are our smallest parrots and the three of them are in the genus *Opopsitta*. Until recently these birds were known as lorikeets, but revised opinion considers the term fig-parrot more suitable.

Actually, all our fig-parrots are considered to be but sub-species of *Opopsitta diopthalma* of New Guinea.

Unlike the lorikeets, the fig-parrots are extremely quiet birds, and being so small and well camouflaged in their green plumage, they are very difficult to see.

The Blue-browed Fig-parrot, *O. coxeni*, is the most southerly form, being found in the coastal scrub and rain-forest of south-eastern Queensland and north-eastern N.S.W. Further up the coast the Red-browed bird, *O. macleayana*, takes over in north-eastern Queensland. The third variety, *O. marshalli*, Marshall's Fig-parrot, is said to be confined to the tip of Cape York.

The Blue-browed bird was first described by Gould in 1867, from a drawing made by a Mr. Coxen of Brisbane, after whom the bird was named.

Not a great deal is known about the life and habits of

any of the Fig-parrots. They frequent tall, fruit-bearing trees such as various native figs—and feed quietly in their tops. Attention is sometimes drawn to a flock, by the pieces of fruit falling to the ground as the birds pull them off the branches. Beneath a tree in which these birds have fed, there is sometimes quite a litter of fruit-debris, and a watch at dawn or dusk might be rewarded by a sight of the birds returning to the tree.

They are said to possess roosting trees in the forest, where numbers of these small parrots return each night after feeding along the edges of the forest and in the clearings.

The Red-browed Fig-parrots' calls have been noted as a soft 'zit-zit', somewhat like the lorikeets' calls, but quieter; also a sharp, clean cut 'brick, brick, brick'. They call to each other very softly sometimes whilst feeding.

Two white eggs are recorded for the Blue-browed and, three or four for the Red-browed bird. The nest is in a hole, high in a tree. The breeding season is probably from October to December.

## COCKATOOS

Next in the order, Psittaciformes, come the cockatoos, amongst which are some of our boldest-coloured and, most striking birds. There are eleven species divided amongst four genera. First come the dramatic 'black' cockatoos; the plumage of which, in some cases, is actually quite brownish.

The Yellow-tailed Black Cockatoo, *Calyptorhynchus funereus*, is a large bird, given added stature by a long tail. These cockatoos are found from central Queensland down to Victoria and Tasmania. Their range then extends westwards to the Eyre Peninsula, South Australia; they are also found on King Island and Kangaroo Island. In pairs during the breeding season, or otherwise in small flocks, these birds frequent the heavily timbered mountain ranges and open forest country. During the winter months they move down to the coastal banksia scrub in some districts.

A local name for them is 'funereal cockatoo'; a suitable epithet anyone would agree who has seen these rather sinister looking birds. I remember once being 'bushed' for some hours in dense and featureless coastal ti-tree and banksia scrub in Gippsland. As we sat down at one stage, to rather gloomily contemplate our next move, a small flock of these dark birds alighted in the trees above us. They peered down, moving their heads and bodies slothfully and grating out their slow harsh call. They certainly looked birds of ill-omen and did nothing to dispel our mounting depression.

Their flight is slow-winged and laboured-looking and as they pass over, their 'loud wailing cries' of 'kee-ah, kee-ah' come floating down.

The food of these birds is mainly the seeds of such trees as banksias, hakeas, and casuarinas. They also feed upon the large white grubs found in the wood of eucalyptus trees. The cockatoo's large and powerful beak is used to tear out the wood of the tree and sometimes considerable holes may be found in branches of trees where these birds have been grub-hunting.

The nest is a hole in a tree, usually of some depth, at the bottom of which, two white eggs are laid on chips of wood. From March to July is the breeding season in the north but usually later in the south.

The White-tailed Black Cockatoo, *C. baudini*, is a somewhat similar bird in appearance and habits to the foregoing species. It is, however, confined to Western Australia. Its range is from the lower Murchison River to Esperance.

It is interesting that two distinct races or sub-species occur in this cockatoo. Birds found in the forests of the south-west corner have a narrow bill (and have been named *tenuirostris*). Inland birds, of the dry sand plains and mallee areas are heavy-billed birds with the upper mandible shortened; these have been named *latirostris*.

Rather nomadic in its habits, within defined areas, this bird becomes a regular 'bird of passage' in the coastal plain and Perth areas. Numbers pass through, travelling north in the autumn and reappear, moving southwards from August to November.

The food of these cockatoos is to a large extent nectar from eucalypt flowers, which explains their seasonal movements. Serventy writes of their nectar feeding '. . . large quantities are consumed, so much so that if a bird is shot when feeding on the blossoms the crop will be found to be crammed with fluid which will pour out of the beak when the head is held down'.

These cockatoos also feed on the seeds of various eucalypts, tearing open the 'gum-nuts' with their powerful bills. Like the yellow-tailed bird, this one is also very fond of the fat grubs found beneath the bark of trees.

The western birds are reported to be very destructive in orchards, bending down the branches with their weight, and eating a great deal of fruit. They are also becoming a pest in government pine plantations, flocking in hundreds to feed on the seed. This cockatoo derives its specific name from Nicolas Baudin, who led a French scientific expedition to the Australian coasts in 1802–3.

The nest is the usual cockatoo arrangement: a hole, high in a tree, at the bottom of which, one or two white eggs are laid. If two eggs are laid often one will be infertile. And, according to notes by C. L. E. Orton, if both eggs do hatch, one nestling is always smaller than the other and disappears within a few days. The breeding season is from August to November and the young cockatoos are fed by the parents for some time after they leave the nest.

The Red-tailed Black Cockatoo, *C. banksii*, is named after Sir Joseph Banks the famous naturalist who did so much work in Australia. He lived from 1743 to 1820.

These handsome cockatoos are found through western, central and northern Australia to Queensland. Occasionally they come into the south-east corner of the continent, visiting South Australia, Victoria and, more rarely, Tasmania. They frequent heavily timbered country and also more open forest and banksia scrub.

In Western Australia it is recorded as never associating with the white-tailed species, and this probably holds true for the rest of its range. They are not crop raiders and indeed have become quite rare in settled parts, where once they were common. It is recorded as having 'declined very seriously' in the southern parts of Western Australia.

When not breeding, these cockatoos live in flocks of up to fifty or so birds. They feed on the seeds of casuarinas, banksias and eucalypts. Like the other black cockatoos, they dig grubs out of the trunks of trees, with their sharp and powerful bills.

In Central Australia the Red-tailed Cockatoo is often associated with aboriginal rain-making ceremonies. The handsome scarlet and black tail feathers are also worn in the hair for corroborees as well as being used to decorate various ceremonial objects.

The nest is the usual cockatoo type: a hole high in a tree. Usually this nest-hole will be out of reach of any white man unless he is equipped with climbing irons and ropes. However, the aborigines ascend to their nests and harvest the young birds which are regarded as 'good tucker'.

One white egg is laid on a few chips of wood at the bottom of the nest-hole, and the breeding season is from April to August. The call of this cockatoo is a loud grating 'kree' or 'krurr' which is often uttered on the wing.

The Glossy Black Cockatoo, *C. lathami*, is named after

the English ornithologist John Latham who lived from 1740 to 1837.

They are the smallest of the black coloured cockatoos and resemble the former species quite closely, except that the glossy is a rather browner bird. Their range separates them to some extent, for while *C. banksii* is found generally throughout the continent, *lathami* is confined to the coastal districts from central Queensland to Victoria; there is also a population on Kangaroo Island.

The staple diet of the Glossy Black Cockatoo is the seeds of sheoak trees: indeed Gould writes 'So invariable did I find it among the *Casuarinae*, that those trees appear to be as essential to its existence as the *Banksiae* are to that of some species of honeyeater'.

Settlement along the coast is destroying much of this cockatoo's habitat and it is becoming quite rare. Pairs or small flocks may be met with, and by disposition, the birds are not particularly shy. If one bird is shot the remainder of the flock do not fly off but land in neighbouring trees as though curious about the fate of the shot bird.

The flight of these cockatoos is 'laboured and heavy' although they are capable of strong, sustained flight. To travel any great distance the birds mount into the air, perhaps on thermal up-draughts, and fly off at a great height.

They lay one white egg in a hole in a tree at heights up to seventy feet or so. The breeding season is from March to August.

Larger than the other black cockatoos, the Palm Cockatoo, *Probosciger aterrimus*, is confined in this country, to the north of Queensland in the Cape York area. It is a magnificently crested bird and a very striking creature indeed. These birds also inhabit New Guinea, where they are common, and the Ann Islands. They were known to naturalists as early as the beginning of the eighteenth century but were not described to science until 1788.

The bird is strangely proportioned, being relatively large headed and small bodied—this appearance is exaggerated by the large narrow-feathered crest which is often erected. The pectoral muscles are also rather underdeveloped and the bird is consequently a weak flier. They are agile however, climbing and hopping about the branches of rain-forest trees in search of grubs, fruits and nuts.

A dead tree, after a Palm Cockatoo has been at it with its gigantic bill in search of grubs, looks as though it has been gone over with a hatchet rather than a bird's bill.

In New Guinea they feed on the nuts of the kanari palm. The shell of these nuts is so hard that a man requires a hammer to open one, but the bird manages with only its bill. The Australian population feeds upon the nuts of the pandanus palms which are equally tough, as well as other nuts and native fruits.

This bird is quite common in the Cape York district—an area still relatively undisturbed by man—and they nest freely in the rain-forests. The nest is usually a vertical hollow in the trunk or large limb of a tree at heights up to fifty feet. At the bottom of the deep hole one white egg is laid on wood-chips and a large amount of splintered twigs. Apparently this is to prevent waterlogging and the consequent chilling of the egg. The breeding season is from August to January.

Gang-gang Cockatoos, *Callocephalon fimbriatum*, are birds confined, more or less, to the south-east of the continent. Their range is from the middle of N.S.W. down the coastal forest districts to the south-east of Victoria. They are also seen on King Island and Tasmania at infrequent periods.

This remarkable looking cockatoo appears to have no close relations, and is becoming quite rare even within its restricted range. Originally described in 1801, this bird was named the Red-crowned Parrot. The strangely filamentous crest on the orange-red head of the male is certainly a striking feature. During the day this cockatoo is said to feed out in fairly open country (in Tasmania on the fruits of introduced hawthorn and briars) and as darkness falls the birds retire to roost in thickly wooded gullies. Most of its food is gathered in trees, where it feeds on the seeds of eucalypts, acacias and other trees. It has a strange wheezy, or rasping note quite unlike that of any other forest bird, and when feeding sometimes utters a curious growling sound.

The Otway Forest is still a haunt of these interesting cockatoos in Victoria and recently I saw and heard one in a brush and tree filled valley on the Yarra River, not many miles from Melbourne.

The name Gang-gang is aboriginal but the earliest known portrait of the bird was labelled 'Red-crowned Parrot'. This picture was surprisingly good and was drawn from a bird obtained in the Bass River Valley.

At any place where they are plentiful enough these birds congregate into winter flocks and move out of the forest areas. There are a number of earlier records of these birds visiting towns, and feeding in the hedges and trees of botanic gardens and other cultivated spots. They are confiding birds as a rule, allowing quite a close approach—I once watched a pair feeding on a fallen tree on Mt. Buller, from only about twenty feet away.

The nest of this bird is hard to find, usually being high in a living tree. The two to four eggs are laid at the bottom of a hollow in the tree, on a few incidental chips of wood. The breeding season is from October to January.

The genus *Kakatoe* (spelt by some ornithologists *cacatua*) contains five cockatoos. One of these the White Cockatoo, *Kakatoe galerita*, must be one of the best known of Australian

birds. Also called the Sulphur-crested Cockatoo, this bird is a favourite pet, many not even being caged, but left to roam at will around the owner's house and garden.

In spite of the trapping and shooting activities of the white man since his advent in this country, the White Cockatoo prospers and proliferates, due to some extent, to the increase of food in agricultural areas.

These birds are particularly fond of wheat, raiding the standing crops in great numbers. They have learned to fear and outwit man to a great extent, and sitting in a tree or on a fence-post above a feeding flock, a sentinel bird or two may be seen. These watch-birds shriek a warning at the approach of danger and the feeding birds flap off to a safe distance.

A large screaming flock of these birds, flying up from a crop, or from a water-hole in the wilderness, is an exciting spectacle of animal vigour and plenitude.

This cockatoo's range is Australia and Tasmania, except for Western Australia south of the Fitzroy River and western South Australia. Outside Australia this cockatoo is found in New Guinea, the Lesser Sunda and the Solomon Islands. They nest in the hollow limbs of trees, often very high above the ground.

Gould reported that thousands of these birds nested each year in the white cliffs along the South Australian reaches of the Murray River. The nesting season extends over a large part of the year; from about August to December.

The Pink Cockatoo, *K. leadbeateri*, is in some peoples' opinion, including my own, the most beautiful of the Australian cockatoos. Some are more dramatic in form and, others like the Galah, may have striking colours, but the combination of rose-pink wings, delicate white back and salmon breast, set off by the gorgeous crest of vermilion-yellow and white, would be hard to surpass.

It is one of the least plentiful of the Australian cockatoos although, as mentioned in the introduction to this Order, they are doing well in the Wyperfield National Park.

They are basically birds of the inland and may be seen visiting water-holes in the most arid country. Pink Cockatoos until lately have been called Major Mitchell Cockatoos, and were named after the explorer who remarked on them with so much delight in the journals describing his explorations. They are still known as Major Mitchells by many people but official ornithological opinion has decided on Pink Cockatoo as the correct name.

They are less noisy birds than the White Cockatoos and have a more plaintive note. It is interesting that they do not respond in captivity in the same way as the white bird. Dr. W. T. Greene in his book *Parrots in Captivity*, does not think much of the bird. 'Beyond his beauty, and that is great, there is nothing to recommend this bird to the notice of amateurs, for he is not very intelligent, nor is he docile, he never learns much and invariably remains wild and suspicious even after years of captivity, and much patient effort to convert him to a better frame of mind.'

This rather retiring, even surly, nature has probably prevented the bird from being even more rare than it is. When they were first taken to England they fetched twenty-five to thirty pounds a-piece. When passages to England were being made in weeks instead of months, and the birds arrived much more rapidly, the price of these recalcitrant cockatoos fell to five pounds or so. Bird trappers thus turned to more profitable species.

The nest is a hole in a tree trunk or the hollow 'spout' of a dead limb. The hole may be two or three feet deep and, at the bottom of this the three or four glossy white eggs are laid. Pairs of birds will return to use the same nest-hole in successive seasons. The female alone undertakes the duties

SUPERB PARROT
16 in.

of incubation and if she is disturbed (by banging a long stick up near the nest for example) she will rocket out of the hole, screaming shrilly as she goes in a flurry of white and pink. The breeding season is from September to December.

The Galah, *K. roseicapilla*, is almost as well known as the White Cockatoo. In pairs or in flocks, sometimes numbering many hundreds, this bird is found in open and lightly timbered country throughout most of the continent. It is regarded as being accidental to Tasmania. They feed on the ground as a rule, on the seeds of grasses and various herbaceous plants and on bulbous roots which they dig up with their bills. They are a mixed blessing to the man on the land, although regarded as thorough pests by most farmers. They consume the seeds of many noxious plants but also raid crops of various kinds, doing a good deal of damage to them.

An example of birds benefiting by the advent of man and agriculture is shown in Western Australia. Apparently,

prior to farming, the Galah did not extend south of the border between the dry 'mulga country' and the better eucalypt country. By the 1920's, they were beginning to spread south as wheat growing developed, and by the 30's and 40's, were really plentiful. It also appears, according to Serventy and Whittell, in '*Birds of Western Australia*' that as the habitat for these birds was man-improved in the south the inland climate has also been deteriorating during this century. Geographical evidence suggests that the inland is going through an even drier cycle than its normally dry weather.

A flock of these birds is a beautiful sight, except no doubt to a wheat farmer, as they wheel through the bright air, the sunlight striking, now on their silvery-grey backs and, now on their flaming rose-pink fronts.

Pests or not, it is hard to imagine how anyone could indulge in the highly unsporting 'sport' of shooting these birds at short range, as they are released from traps. Yet this is a popular pastime at many country gun-clubs.

The bird was first described from a bird sent to the Paris Museum in 1817. They were popular as food with the early settlers, being the ingredient of many 'parrot pies'. They are still eaten in some districts and I have had roasted galah when living off the land. Dry-roasted on a stick, they are pretty basic 'survival-food' and require some good draughts of creek-water or billy-tea to wash them down!

This handsome cockatoo is holding its own and even thriving at present, even though there is a bounty on its head at times. But, remembering the fate of the passenger pigeons that literally darkened the sky in their passing millions in America, and that in a few years were wiped from the face of the earth, we should at least be circumspect in our persecution of the 'rose-breasted cockatoo'. The threshold of numbers required to continue the race is sometimes quite high in flock animals, and should the number fall below the minimum then the animals begin to

breed more slowly and die faster than they reproduce.

The Galah nests in a hollow, often quite deep, in a tall tree. Sometimes a large dead eucalypt will contain a number of nesting pairs in various hollows and broken branch 'spouts'.

Four to five eggs constitute the usual clutch and these are laid on a bed of fresh green gum-leaves. The young birds have the adult colouring in their first feathering. The breeding season is typically from September to November, but may be later in various areas or in certain conditions.

The two white cockatoos known as Corellas are rather similar to each other but may be told apart mainly by the length of their bills; although one species is known as the Corella and the other as the Little Corella, they are both the same size except for the bill.

The Corella, *K. tenuirostris*, is found in south-western Australia and north to Geraldton. It also inhabits south-eastern South Australia and Victoria but not Tasmania. It also appears that scattered populations of this Corella extend into 'Little Corella Country', through Western N.S.W. and into central and north-western areas of the continent.

This cockatoo was once very common, but in many districts has disappeared or become rare. They are birds of the inland but are rarely seen far from permanent water, and are thus considered by bushmen as being a reliable 'water-guide'.

They have been persecuted in various ways over a great deal of their territory. Continual shooting, because of their raids on crops, has depleted them and trapping has also been very heavy in the past. Added to these direct inroads, has been the inevitable destruction of the grasslands that provided the birds with food, and over much of the land remaining, they have to compete with stock.

Apart from crop-raiding, the basic diet of these cockatoos is roots, bulbous plants and tubers, and digging these up is the use to which the corella puts its very developed upper mandible.

These birds are considered to be amongst the best talkers in the bird-world and consequently thousands of nests were regularly raided each year (until the species was protected) to supply the city markets with young birds. They take kindly to captivity, rapidly becoming friendly and docile.

They nest in a hole in a tree, often high off the ground. Two to four white eggs are laid and the breeding season is from August to November.

The Little Corella, *K. sanguinea*, was once known by the translation of its Latin name—and was called the Blood-stained Cockatoo, a name given to it by Gould. It was not a particularly happy choice, and Corella is no doubt a more euphonious name for quite a handsome bird. Its range is restricted, in the main, to the north. From north-western Australia, it spreads across the Northern Territory and Central Australia to western Queensland and western N.S.W., South Australia and north-western Victoria.

The Northern Territory is one of its strongholds; the naturalist Charles Barrett writes of a boat-trip down the Daly River and the thousands of Little Corellas that flew up . . . 'from trees which appeared to be covered in white blossom until the birds left their perches to fly ahead of the boat, screeching their protest, . . .'.

Large numbers of these cockatoos are still seen in some places, in spite of persecution of various kinds, and in the north-west of Australia it is the common cockatoo. Vast flocks are met with and one such gathering near Wyndham was estimated to be between sixty and seventy thousand. These cockatoos indulge in high spiralling flights mounting

upwards '. . . as though climbing an aerial staircase . . .'.

They are ground-feeders; eating the seeds of various plants and bulbous roots, although compared with the long-billed birds, this cockatoo is much less of a digger. They also perform a useful service to the pastoralist in consuming the seeds of the 'paddy-melon', which is said to cause blindness and paralysis in horses; the 'double-gee', *Emex australis*, which causes lameness in sheep, is also eaten.

The nest is in a hollow in a tree growing near, or even in, water. These cockatoos will also breed in holes in cliffs and, in treeless areas, they are known to nest in cavities in the tops of tall anthills. A clutch of eggs is usually three, these are white and the breeding season is from August to October.

## COCKATIELS

The Cockatiel, *Leptolophus hollandicus*, is found throughout most of inland Australia in suitable habitats. It rarely visits coastal districts and is considered to be accidental to Tasmania. They prefer open country, with belts of scrub, and threaded by water-courses, where they may be found in the trees along the water's edge.

These handsome little parrots are nomadic, their wanderings being governed by food supply, which is the seeds of various grasses and plants.

Long familiar as a cage and aviary species, they breed freely in captivity. Apparently, the males make better pets than the females. The males will learn to talk a little, and become very attached to their owners.

They were once extremely numerous, and considerable flocks can still sometimes be seen, but perhaps not in the numbers seen by Gould who wrote in his rather heavy-handed manner: 'I have seen the ground quite covered with them while engaged in procuring food, and it was no unusual circumstance to see hundreds together on the dead branches of gum trees in the neighbourhood of water, a plentiful supply of which would appear to be essential to their existence'.

Cockatiels almost invariably perch in dead trees when flushed from the ground or landing after a flight. They also have the rather odd habit of perching along a branch as often as across it.

These birds have a soft, quite pleasant, chattering note with which they call to each other while flying or busily feeding. They nest in holes in dead or living trees, often in the hollow 'spout' of a broken dead branch. Sometimes a number of these birds will be found nesting in the same trees as galahs. From four to seven white eggs are laid and the breeding season is August to December.

## PAPUAN PARROTS

We have in Australia, two parrots considered to be Papuan birds that have extended their range into this country.

The first of these is the Red-sided Parrot, *Lorius*

*pectoralis*, which is a large cockatoo-like parrot found in north-eastern Queensland from the Pascoe River district to Atherton Tableland.

This bird is interesting because it is unique amongst Australian parrots, with the expected colouring being reversed in the sexes. The male is green, with bluish shoulders and a flash of red on the flanks, but the female is resplendent in crimson, purple, maroon and ice-blue; she is even a trifle larger than the male. The differences between the two sexes is so marked that for years they were thought to be two species; it was more than fifty years after the male was discovered that the female was described to science. One clue, perhaps, to the masculinity of the male bird is its red bill, which in the female, is brownish-grey. Both the birds were known nearly two hundred years ago outside Australia but were not discovered in this country until 1913.

Found mostly in the thick jungle and rain-forest country of the coastal districts, this bird is quite numerous. It is, however, a wary bird, staying in the tops of tall trees, often in small flocks. They are noisy birds, calling to each other through the forest, as they fly with a loud 'kar, kar, kar'. The males also have here a quieter 'quork' sound, and the call of the female is a 'screeching whistle'.

They nest in a large hole, usually high in a forest tree. An almost entirely hollow trunk may be utilised, and thus the eggs might be many feet from the entrance hole—even approaching ground level.

Two white eggs are laid and the breeding season is from October to December. Although these parrots have formidable-looking bills, they are primarily fruit eaters and do not habitually crack nuts.

Our other bird which has apparently spread from New Guinea is the Red-cheeked Parrot, *Geoffroyus geoffroyi*, which is a much smaller parrot than the preceding species but still has a solidly built, almost stocky, appearance.

They are found in north-eastern Queensland, from the Pascoe River district to the Rocky River.

The sponsor of a collecting trip to Cape York, Dr. W. MacGillivray, writes of the discovery of this bird in 1913 by his collector. 'When proceeding up the river in search of a suitable camping place, one of the objects which attracted his attention was a strange parakeet, which flew from the scrub lining the banks of the river. Its call and flight were unfamiliar to him, and I have now received from him a male and a female of what seems to me not only a new species but a new genus.' (*The Emu*, October 1913.)

Dr. MacGillivray was quite right, and although his account reads rather like a policeman's 'report on the proceedings' it must have been an exciting thing to have discovered two new parrots on the one expedition; the Red-sided Parrot was also found on this trip.

Red-cheeked Parrots are wary birds, keeping to the tree-tops in the tall rain-forests and jungles. If disturbed they fly swiftly off, screeching as they go.

The nest is in a hollow tree, but apparently there is only one recorded. This was a nest found by the same collector mentioned above (W. McLennon); the nest contained two young in December, so the eggs have not yet been recorded.

## THE APROSMICTUS PARROTS

In the next genus we have two solidly built and rather solidly coloured parrots, the King and the Red-winged.

King Parrots, *Aprosmictus scapularis*, are found from Cooktown in Queensland to southern Victoria but do not cross to Tasmania. They may be seen in pairs or small flocks, and they frequent the timber and thick brush-covered ranges and valleys.

CLONCURRY PARROT
14 in.

RINGNECK PARROT
13 in.

PORT LINCOLN PARROT
15½ in.

TWENTY-EIGHT PARROT
17 in.

Once much more common than they are today, timber cutting and the clearing of land has destroyed their habitat to a great extent; before they were protected by law, trapping also reduced their numbers. Their simple but splendid colouring made them popular as cage-birds.

The immature plumage of these birds, resembles the all-green dress of the females, and the males do not assume adult dress until three years old.

When disturbed, a flock of these birds flies off with loud cries of 'eek-eek-eek' that rings through the forest like an alarum-signal. They also have a soft and musical whistle with which they appear to communicate with each other whilst they feed through the tree-tops. These parrots eat the seeds of native shrubs and trees, native fruits, and in some districts they have taken to raiding the maize crops.

The eggs are laid in a hollow tree, some nests being found twenty feet or so down from the entrance hole. From three to six eggs are laid (authors differ on the average number) and the breeding season is from October to December.

The Red-winged Parrot, *A. erythropterus*, is an inhabitant of northern Australia from the Kimberleys to eastern Australia, down through the inland areas of northern N.S.W. to north-eastern South Australia. Sometimes these birds will move further south or visit coastal districts. Indeed the bird was first collected near the coast by members of Captain Cook's expedition, but settlement has probably driven it inland.

They are not confiding birds; Gould found them naturally shy and wary and '. . . much more difficult to approach then the generality of parakeets . . .'.

These parrots are unusual in that their flight is not the typical swift and rapid progress that one associates with parrots. It has been described as slow and laboured, and also is buoyant, but all agree that a flock of these richly coloured birds flying against the blue sky of the north, is a very beautiful sight.

The food of these birds is nectar, seeds, native fruits and insect larvae.

Three to six white eggs are laid at the bottom of a deep hollow in a tree, often far below the entrance: the breeding season is from September to December.

## LONG-TAILS

The next genus, *Polytelis*, is a small group of very beautiful, long-tailed and, elegantly formed parrots.

Superb Parrots, *Polytelis swainsoni*, are well named with their bright emerald-green plumage set off with crimson and golden-yellow.

They are found from about the region of the Murray River, along the border of N.S.W. and Victoria, and the range extends northwards to the upper reaches of the Castlereagh and Lachlan Rivers. Occasionally birds are reported as far east as the Sydney area.

These parrots have long been favourites as pets, which has done them no good as a species, heavy trapping reducing their numbers almost from the time that they were discovered. Nowadays they are hardly ever seen over most parts of their theoretical range, being confined to the park-like, tree-dotted plains of middle-eastern N.S.W.

As cage birds they will learn to talk but are great fliers and are 'happier' in aviaries, where they will sometimes breed. The following account of the male bird's display is by the Marquess of Tavistock, a great authority on aviculture: the display of wild-birds would probably be much the same. 'Sometimes he will fly in a very slow and laboured fashion around the hen, bowing as he alights, with con-

tracting pupils and uttering a great variety of calls. When very excited he will puff his head feathers, draw his body plumage tight, partly spread his wings and race to and fro round the hen in a series of rapid hops, 'scrooging' at the top of his voice. If the object of these intentions is favourably impressed she crouches motionless with puffed head feathers and partly spread wings.'

The strange thing is that this display takes place months before the birds are in full breeding condition, and is not repeated later in the year. These parrots feed on grass seeds and other plants and the nectar of flowering eucalypts.

The nest is a hole in a tree, high above the ground, where four to six white eggs are laid: the breeding season is from September to December.

The Rose-throated Parrot, *P. alexandrae*, which until recently has been called the Princess Parrot, is a bird of the far inland. The range of these parrots is the Northern Territory, central-western and north-western Australia, and northern South Australia.

In pairs or in small flocks these birds usually frequent timber belts along or near water-courses. It is a nomadic species and they cover vast areas in search of seeding grass; the spinifex is the chief variety on which they feed.

A flock of these delicate birds keeps up a continuous chattering whilst perched in trees, and even a pair will 'talk to each other' in pleasant tones. Their beauty and their friendly disposition has made them a popular and highly-priced bird in England and Europe amongst bird-fanciers.

These birds have the strangely reptilian habit of sometimes sitting or lying *along* branches rather than across them. The nest is the usual hole in a tree or a stump and is usually in the vicinity of, or on the banks of, a creek. Four to six white eggs are laid. The typical breeding season is from September to December but may be at other times depending on the availability of food. They will appear in a locality, nest, and then depart; perhaps not to return for a number of years.

The Regent Parrot, *P. anthopeplus*, is found in northern Victoria and southern N.S.W., across to the Mallee districts of south-eastern South Australia. There is also a separate population in south-western Australia. In the west this bird is more often called the Smoker Parrot.

There is an interesting difference in the way that the eastern and western populations of these birds have reacted to the spread of agriculture. In the Mallee country of the east the Regent Parrots have noticeably declined as their habitat was tamed to wheat growing. In Western Australia exactly the reverse has taken place; taking advantage of the increase in food supplies, the bird has increased to such an extent that it has been declared vermin in a number of areas.

Like the other two species in this genus, they are beautiful birds, and a flock of them in flight is a bird-watcher's delight.

Apart from raiding wheat and other crops, their food is the seed of grasses and other perennials and, also the seeds and buds of various eucalypts. To change feeding grounds they often mount to a great height before heading straight off for their destination.

The nest is a hole in a tree and four to six white eggs are laid. The breeding season is September to December.

## ROSELLAS

The Rosellas constitute our largest genus if we include the Blue-cheeked Rosella which appears to be a form of the Pale-headed. Amongst them are some of our best known parrots and some of our most decorative.

The name rosella is said to be derived from the fact that rosellas, or 'rosehill parrots', were first seen and named in the Rose Hill district of Sydney.

The Crimson Rosella, *Platycercus elegans*, is one of the best known of the group and a great favourite with bird-fanciers and breeders. The breeders usually refer to this bird as Pennant's Parakeet, and indeed seem to have their own names for all the rosellas, all of which terminate in parakeet.

They become quite tame in such places as national reserves, coming to picnics to share in the bread and pieces of fruit.

The Crimson Rosella was first given the name 'Beautiful Lory' by Latham in 1781. He was describing it from a very good specimen owned by Sir Joseph Banks.

These rosellas are not particularly destructive but they did learn early to take advantage of the settlers' corn fields. They may frequently be seen in small flocks, along with the King's Parrot and the Lory, in fields of Indian corn.

The Lory referred to, is the Crimson Rosella. This is an extract from an observation by George Caley, a collector for Sir Joseph Banks; he is not to be confused with Neville W. Cayley, the artist and naturalist who died in 1950.

These rosellas have remained common even in places settled by man, and sometimes may even be seen in city parks and gardens. In the bush they frequent heavily timbered ranges and valleys and make bright flashes of colour in the deep fern-tree gullies.

The females are not as large as the males and are of a less brilliant colour, although having much the same disposition of colour. Young birds are green and do not attain adult plumage until the third year.

They nest in a hole in a tree which may be either dead or living. Five to eight white eggs are laid and the breeding season is from October to January.

The Green Rosella, *P. caledonicus*, being named after the island of New Caledonia, has been named in error, for this bird is confined to Tasmania and the islands of Bass Strait.

This bird is regarded as very common and it is pleasant to come upon a handsome parrot that does not seem to have suffered as a species, at the hand of man. They were common in Gould's day also, as one can see from these notes of his

RED-CAPPED PARROT
14 in.

on the bird which, incidentally, he called the Yellow-bellied Parakeet. 'It runs over the ground with great facility, and when observed in small flocks searching for seeds among the tall grass, few birds are seen to greater advantage. I found this species very abundant on the banks of the Tamar, and in one instance, I saw hundreds congregated at a barn door among the straw of some recently thrashed corn, precisely after the manner of pigeons and sparrows in England'.

They are something of a nuisance to orchardists and

farmers at times, but remain abundant in spite of persecution. Green Rosellas do not confine themselves to agricultural areas, however, and may be found on the thickly wooded mountain slopes, in the brush-filled gullies and out in more open, park-like country; practically anywhere in short, where they can find food.

These birds feed on a variety of things. Gould records that '. . . the flowers of the *eucalypti* with insects and their larvae constitute a considerable portion of its food . . .' Sharland says that this rosella prefers the high rainfall areas, as a rule, '. . . although there is scarcely a district in which it does not appear from time to time'. There appears to be a good deal of colour variation in Green Rosellas; it seems that birds which live in heavy rainfall areas in the mountains are duller than the birds in the drier country areas.

The call is 'kussick, kussick' and the bird may be heard in thick forests far more often than it is seen. When perched, or on the ground, these rosellas have a series of fluting or bell-like notes, which are most pleasant.

The size of the flocks increases in winter, and they forage along the country roadsides in the hawthorn, briar and bushes, for berries and seeds.

The nest is a hole in a tree and four or five white eggs are laid. The breeding season is from about November to December.

The Adelaide Rosella, *P. adelaidae*, is a very local bird, being confined to the Flinders Ranges and Mount Lofty areas in South Australia. Apparently it is more common about Mount Lofty where it may be seen in pairs or small flocks. Its life and feeding habits are similar to those of most other rosellas, and it is sometimes a nuisance to orchardists.

Five to seven white eggs are laid in a hole in a tree and the breeding season is from September to December.

The Pale-headed Rosella, *P. adscitus*, is found from northern and eastern Queensland to northern N.S.W.; it has been recorded as a rare visitor as far south as Sydney.

These subtly coloured and very beautiful parrots seem to be maintaining their numbers in spite of being fairly local in distribution.

They are often seen in company with Eastern Rosellas and it seems that they interbreed. Pale-headed Rosellas with red colouring on the head are probably the result of this cross. These rosellas are birds of the open forest and are usually seen in pairs or small flocks.

The nest is a hole in a tree or short stump and often the egg-chamber is several feet below the entrance hole. Attention is often drawn to the nesting tree of these and other rosellas by the very loud noises made by the nestlings.

From three to five or six eggs are laid and the breeding season is from September to December typically, but may be at almost any time after good rains.

There appears to be a race or variation of the Pale-headed Rosella inhabiting Cape York Peninsula, starting

more or less where the Pale-headed leaves off. This has been called the Blue-cheeked Rosella, *P. adscitus amathusia*. Whether this is a cline—with one type merging into the other—or whether there is a clear distinction between the two types, is uncertain.

In any event, the habits of the Blue-cheeked bird appear to be similar to those of the Pale-headed Rosella.

The Northern Rosella, *P. venustus*, is found in the Kimberley area in north-western Australia and the northern parts of the Northern Territory.

This bird is known as the 'smutty' amongst bird-trappers, in sharp contrast to the very poetic name 'Moon-

COCKATIEL 12 in.

dark' given to this rosella by the Port Essington natives.

There is a further interesting story attached to this bird's name. Latham, in his *General History of Birds*, called this parrot *Platycercus brownii*, and for many years it was known as Brown's Parrot (and still is amongst breeders). Brown, the famous botanist who travelled with Flinders on his voyage around Australia, actually did discover the bird. But by the law of priority (to which nomenclature strictly adheres) the bird eventually had to be called *venustus*, a name given to the parrot by Brown himself in 1820.

They frequent grassy meadowland and the fringes of swamps where they feed on the seed of grasses and other plants. Sometimes in pairs, but more commonly in flocks of twenty or so the birds move across the ground feeding busily.

The call of these parrots is a frequently uttered double 'trin-se, trin-se'. They fly low, in a rapid zig-zag, and seldom further than from tree to tree.

Nesting is in the usual hole in a tree; the breeding season is from August to October and two or three white eggs are laid.

Yellow Rosellas, *P. flaveolus*, are found along the river systems of the Lachlan, Murrumbidgee and lower Darling in N.S.W; also along the Murray River to South Australia but they are rarely seen in southern Queensland.

In pairs or small parties they frequent the timber along water-courses, feeding out in the nearby open country. They are usually seen on the ground, foraging for grass seeds and similar food. If disturbed they fly off to the nearest timber, uttering their pleasant whistling calls whilst on the wing. There is considerable variation in plumage colour amongst these rosellas but they are usually quite recognisable.

They nest in a hole in a tree, laying four or five white eggs, and the breeding season is about December or January.

The Eastern Rosella, *P. eximius*, is probably the rosella known to more people than any other. It is also one of the most beautiful; familiarity perhaps, making it less exciting to bird-watchers.

As Charles Barrett says in his book *Parrots of Australia*, the Eastern Rosella early became popular '. . . for puddings and pies, and for ships to take to England'. Those sent to England and Europe to the breeders and fanciers quickly became extremely popular and even before the turn of this century these birds had been '. . . so frequently bred on the Continent and in England that it might almost be looked upon as a European bird'.

They feed both in trees and upon the ground, searching for berries and fruit of various kinds and the seeds of grasses and other plants. Eastern Rosellas are sometimes guilty of raiding orchards and other cultivated crops.

Cross-breeding in the wild with Crimson Rosellas is not unknown and in north-eastern N.S.W. it interbreeds quite frequently with the Pale-headed Rosella.

Nests have been found in holes in fence-posts but usually the more normal site, a hole in a tree, is used. From four to nine eggs may be laid, and the breeding season is from September to January.

The Western Rosella, *P. icterotis*, is confined to south-western Australia. Its distribution extends up to Moora in the north and in the east to the Wongan Hills, Merridin and the Dundas district. (*Birds of Western Australia:* Serventy and Whittell.)

Their habits are much the same as the other rosellas. A good deal of their time is spent on the ground searching for grass seeds and similar food, but they also do some damage in orchards. Because of its depredations it was declared 'vermin' in 1921, although being less destructive than some other parrots. The call note is syllabalised as 'chink-chink'.

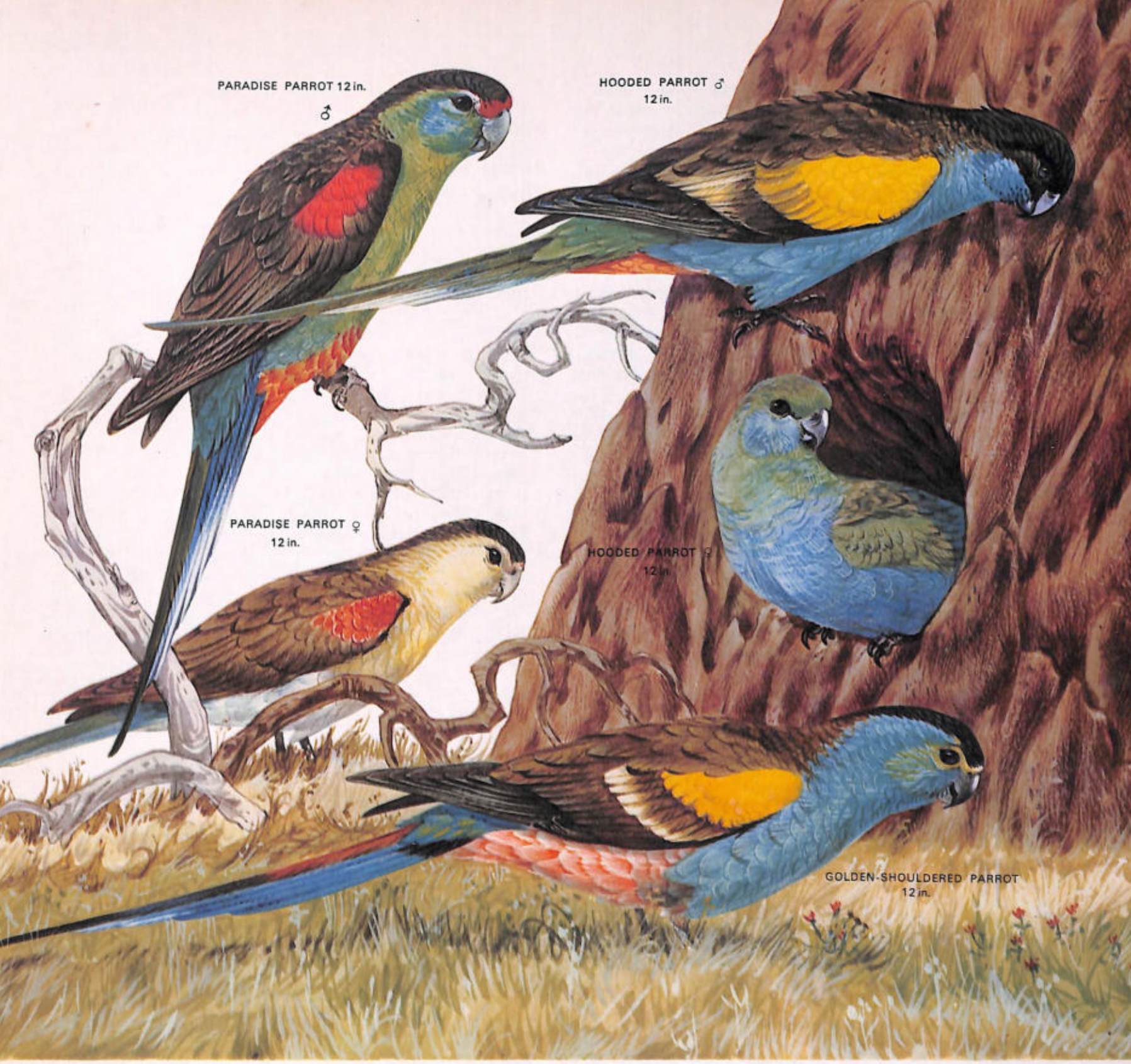
The nesting site is the usual hole in a tree and from three to seven eggs are laid. The breeding season is from August to December.

Two distinct sub-species of this bird are recognised. The male of the sub-species, *P. icterotis xanthogenys*, has red edging to the black scapular feathers, where the full species has green. In the female of the sub-species, the back is dark grey with the feathers edged in buff, whilst in the female of the full species the back feathers are edged with a definite green. The sub-specific bird tends to be found inland.

The next genus—*Barnardius*—contains four solidly built, rather similar looking parrots. Two of the birds are eastern species, with greenish crowns, and the other two are Western birds, distinguished by their black crowns.

## RINGNECK PARROTS

The Ringneck Parrot, *Barnardius barnardi*, is a typical parrot of mallee country. It is found in the interior of southern Queensland, western N.S.W., north-western Vic-




toria and eastern South Australia to the York Peninsula.

They move about in pairs or small flocks and frequent scrub, open forest and the timber along creeks and rivers.

These handsome parrots spend a great deal of their time on the ground, seeking out seeding-grasses and other plants, but also feed in trees on the flower-buds of various eucalypts, chattering as they move through the foliage.

Due to the clearance of large areas of mallee and other scrub to plough the ground for wheat, the Ringneck is gone from many of its old haunts.

The nest is a hole in a tree, and four or five white eggs are laid. The breeding season is from July to December.

The Cloncurry Parrot, *B. macgillivrayi*, is the other eastern species of *Barnardius*. It is very local in its distribution being found only in the interior of north-western Queensland. This bird was discovered by Alexander MacGillivray at a station on the Fullarton River. This is a few miles east of Cloncurry from whence the bird derives its popular name. They were described by A. J. North of the Sydney Museum in 1900.

Little observation has been made of these birds but its life and habits appear to be similar to those of the other ringnecks.

The nest is a hole in a tree, wherein four or five white eggs are laid: the breeding season is generally from August to December.

Port Lincoln Parrots, *B. zonarius*, are found only on the western side of the continent. Their range is the north-western and central-western areas of West Australia, through central Australia to Lake Eyre, the Flinders Ranges and Spencer Gulf.

Their life and habits appear to follow the general *Barnardius* pattern. Early in the nineteenth century, when this bird was first discovered, they were very plentiful—even around Port Lincoln—but thousands of birds have been taken from the more accessable areas for the cage-bird market, and now one has to travel further afield to see these birds in their natural state.

The Twenty-eight Parrot, *B. semitorquatus*, is considered by some ornithologists to be but a form of *B. zonarius*.

Between the extremes of *zonarius* and *semitorquatus* there are various types of hybrid, and in some areas it would be difficult to make a distinction. In the south-west corner of Western Australia, a relatively wet area, *semitorquatus* is present. Almost all the birds south-west of a line from just above Perth to just west of Albany, belong to this type. Inland, the other type, *zonarius*, is the common bird, and between these two areas is a belt of country in which the birds grade into various combinations of the basic types. (*Birds of Western Australia:* Serventy and Whittell.)

Taking these ringnecks as a whole, they are Western Australia's commonest parrots. They have become a considerable pest, in orchards and in the wheat-growing areas, to such an extent that in 1921 they were declared 'vermin'. Large numbers are killed each year, but as a species they appear to be more than holding their own.

The nest is a hole in a tree-trunk or the spout of a broken limb. Five eggs is the usual clutch and the breeding season is from August to December.

## RED-CAPPED PARROT

The Red-capped Parrot, *Purpureicephalus spurius*, is rather an odd bird, in a genus of its own, which is confined to the south-west corner of Australia. In coastal districts its range extends northwards only to the Moore River and south-east to Esperance. Inland the bird ranges to Gingin and Mooliabeenee.

The Red-capped Parrot was once generally known as the Pileated Parakeet—and amongst bird fanciers and breeders it still is—although 'red-capped' is now more generally used. The word pileated simply means 'capped' and so is felicitous enough in meaning, if not in sound.

They are a numerous species and in many places cause considerable damage to orchards. In certain districts they were declared 'vermin' in 1943, and many are shot each year. Dr. H. D. Groen, in his book, *Australian Parakeets*, raises an interesting point in opposition to the export ban on Australian birds, (Red-capped Parrots in particular).

Referring to the large numbers shot by orchardists and others, he says: 'Of course, nobody can blame these people for protecting their property, but it is spiteful that countless serious-minded bird-lovers outside Australia are denied the joy of tending and coddling animals, which are being persecuted and destroyed relentlessly in the wild state. The export ban finished the regular trade, in which undoubtedly often needless suffering has been inflicted upon birds owing to inadequate methods of transport, but at the same time, this ban promoted smuggling and everybody knows about the doping of birds and other cruelties in that kind of trade. Up to the present, this disgraceful bird-smuggling still goes on and it will continue to do so in spite of the most rigid control at customs. The end of the export ban would mean the end of this abuse and at the same time it would put out of business many profiteers and bird-smugglers'.

When not causing havoc in orchards, these parrots feed on the seeds of various eucalypts, notably the Karri Gum. Their long, hooked upper mandible enables them to extract the seeds from the 'gum-nuts'. They bite off the capsules or pick them up off the ground, holding them in one foot whilst they extract the seeds. Karri Gums and Red-capped Parrots are often closely associated, and it may be that these are the only birds able to prise the seeds of this tree from their hard woody capsules.

They nest in the usual parrot fashion in a hole in a tree, usually high above the ground.

Usually five, but sometimes up to nine white eggs are laid, and the breeding season is from August to November. The call of these parrots is a strange grating sound, repeated a number of times.

## PSEPHOTUS PARROTS

The genus Psephotus contains seven species or eight, depending on one's views on the classification of the blue-bonnets. They are all rather elegant birds, and most have bright, though delicate, colouring: much of their time is spent on the ground where they feed on grass seeds.

Probably the most common of the group is the Red-backed Parrot, *Psephotus haematonotus*. They feed in flocks, which, out of the breeding season, may be quite large. The rank grasses along the borders of country roads are a favoured spot, and they may often be put up as one drives along.

When resting between feeding times, or early in the morning, whilst waiting for the weak winter sun to warm them, they have the habit of sitting in rows, shoulder to shoulder along the dead bough of a gum tree. Their delicate yellowish-green plumage and the few spots of red, where a bird has turned its back, make a handsome picture against the silver-grey dead wood and the pale blue sky.

Gould has a note referring to this habit of perching in trees which, incidentally, indicates that they were rather more common in his day. 'In the early morning and not infrequently in other parts of the day, I have often seen hundreds perched together on some leafless limb of a *Eucalyptus*, sitting in close order along the whole length of the branch, until hunger prompted them to descend . . . or the approach of a hawk caused them to disperse.'

The range of these parrots is from south-western Queensland to Victoria, southern and north-eastern South Australia. In Victoria they sometimes visit coastal districts.

The birds' call notes have a pleasant whistling, sibilant quality, 'almost approaching to a song, which is poured forth both while perched on the branches of the trees and while flying over the plains'.

A hole in a tree is chosen for a nesting site and this may be at almost any height. The breeding season is from September to December, and five to seven white eggs are laid.

The Mulga Parrot, *P. varius*, is a parrot of the inland, rarely, if ever, visiting coastal districts.

Their range is Central Australia, south-west Queensland to north-western Victoria and inland South and Western Australia.

They are often found in the company of Red-backed Parrots, and like them, spend a large part of their time feeding on the ground. Their diet is the seeds of various grasses and herbaceous plants. They forage in pairs, family parties, or small flocks.

Until recently this bird has been known as the Many-coloured Parrot; it perhaps warrants the name no more than some other species, although it has, certainly a mixture of brilliant hues. It appears that the further north one goes, the less brilliant are its colours, especially the scarlet mark-

BLUE-BONNET
YELLOW-VENTED PARROT
12½ in.

ings on the back and sides of the male.

They nest in holes in trees, usually fairly high, and lay their eggs on the few chips and wood-dust at the bottom of the hollow. Four to six white eggs constitute a clutch, and the breeding season is from July to December.

This parrot is popular amongst bird-fanciers, being bred in this country and in Europe in considerable numbers. First records of it breeding in overseas aviaries come from France, 1877, Belgium, 1882, and England in 1902. In spite of being a parrot of our hot inland areas (although it should be remembered that 'desert' nights get very cold) these parrots seem to stand up to the European winter quite well.

The Mulga Parrot has been cross-bred with a number of other *Psephotus* species, and the Golden-shouldered Parrot–Mulga Parrot hybrid is a surprisingly correct replica of the legendary Paradise Parrot; a bird which may be extinct. These hybrids have been bred by Sir Edward Hallstrom in Sydney, and their resemblance to the Paradise Parrot is so strong that Groen has made the speculation that the Paradise Parrot may indeed be a natural cross.

The Golden-shouldered Parrot, *P. chrystopterygius*, is a beautiful bird found in the Cape York Peninsula area, from about the Watson River in the west to Laura in the east. Barrett, in *Parrots of Australia*, also gives its range as west to as far as Normanton.

In pairs or in small flocks, they are found in open, lightly timbered country, usually where termitaria abound.

Although so local in distribution, they do not appear, from accounts, to be particularly rare.

This parrot nests in a tunnel which it excavates in the hard soil of a termite-mound. There is an interesting symbiotic relationship between these parrots and a caterpillar. In most, or all, of the nesting-holes that contain young birds, will be found large numbers of the pupae of the scavenging caterpillar, *Neossiosynoeca scatophaga*; these live communally with the birds, feeding on their faeces, and thus keeping the nest clean.

The Golden-shouldered Parrot is not common in captivity. In 1922 McLennan, a collector for H. L. White, found a number of these parrots breeding in the Coen district on Cape York Peninsula. Some nestlings which he took were reared by hand and later given to the Taronga Park Zoo, where they lived for several years.

Today, Sir Edward Hallstrom in Sydney is apparently the only breeder in the world, who has succeeded in developing a considerable stock, since his initial success in 1954.

In the wild, two broods may be raised each breeding season: the first clutch being laid in May. The second brood are reared in July or August. Six eggs are the normal clutch and these are white.

A very similar-looking parrot, closely allied to the above species, is the Hooded Parrot, *P. dissimilis*. It is confined to the Northern Territory, apparently not reaching either the Kimberleys in the west nor Cape York Peninsula in the east.

Described in 1898 from a specimen obtained near the Mary River, the collector writes, 'This Parrot was met with here and there in small flocks in Arnhem Land, particularly between Pine Creek and the Catherine River, but did not appear to be common. It was seen only during the dry season. It possesses a singular jarring cry and, like all parrots, is reluctant to forsake a wounded companion.'

They may generally be observed in open forest or park-like country, feeding on the ground where they forage for seeds of various kinds.

If disturbed they will fly off to the nearest tree to observe the intruder. The flight of these beautiful parrots is swift and slightly undulating.

When coming to drink at a water-hole they show considerable shyness and caution. They perch in a high tree a few hundred yards off to spy out the land; when a number of other birds are drinking, they will venture down to take their turn.

In some cases, the birds appear to decide that it is not safe enough and after some time fly off to the next drinking place which may be miles away.

Like the Golden-shouldered Parrot, this bird nests in a termite mound. The funnel is just the right diameter to take the bird but at the end there is a chamber about six inches across.

The clutch varies from one to five but most nests contain two eggs.

The display of the male bird in captivity is quite striking as he '. . . puffs out the feathers on his lower breast, so that they stand out separately, and performs graceful short flights around the hen, holding himself very upright and alighting and walking with a great deal of dignity and swagger'.

In aviaries these parrots breed readily in hollow logs, and any attempts at getting the birds to nest in artificial termitaria have failed.

The Paradise Parrot, *P. pulcherrimus*, is by far the rarest of the group and may even prove to be extinct. Their range is, or has been, north-eastern N.S.W. and south-eastern Queensland.

This bird was first described and named by Gould in 1843. He wrote: 'The graceful form of this Parakeet, combined with the extreme brilliance of its plumage, renders it one of the most lovely of the Psittacidae yet discovered . . .'

There were various observations and records of this kind thereafter until about the turn of the century. For some years after this, no more was heard of these parrots, and by many people it was feared to be extinct.

In 1918 Alec Chisholm, on the basis of vague hints and reports from various bushmen, started an enquiry through the medium of the press.

Amongst many letters that turned out to be false alarms he received one that eventually led to the bird's re-discovery.

In January, 1922, a pair of these parrots were found working on their nesting-hollow. A close but cautious watch was kept on the birds, every effort being made not to disturb them and at last, in March, it was reported with certainty that the female was brooding eggs. A hide was erected some distance off from which observations and photographs were taken.

The female did all the brooding, but the male visited the nest entrance frequently. He would land, look into the hole, giving soft sweet chirps until his mate appeared and flew off with him.

Unfortunately the eggs never did hatch and there have been few rumours or sightings of the species since.

Whether it is extinct today, or still exists in scattered pairs somewhere, is not known.

The Blue-bonnet Parrots in the genus *Psephotus* show a good deal of plumage variation. The group seems to resolve itself into two species one of which has two forms.

The Little Blue-bonnet, *P. narathae*, appears to be restricted to the district around the town of Naretha in Western Australia. It is a smaller bird than the other Blue-bonnets, is red-vented, and does not appear to overlap geographically.

In south-western Queensland there is another larger red-vented bird called the Blue-bonnet, *P. haematogaster*.

In north-eastern and southern South Australia there is a yellow-vented form of the Blue-bonnet, and geographically between, the two birds occur with varying amounts of red on the yellow under-tail coverts. These are no doubt offspring of red and yellow-vented birds breeding together.

The southern, yellow-vented bird has been given the sub-specific name *xanthorrhous* although it should be con-

sidered a *form* rather than a clear sub-species.

Matthews named the group Northiella in 1912 but more recent opinion includes them with the Psephotus parrots.

Blue-bonnets were first described by Gould in 1837 and he was already suspicious of the specific status of the birds. He wrote 'I think there are two birds confounded under this name (*Psephotus haematogaster*) one with yellow and the other with scarlet under-tail coverts; but it will be necessary to see other examples before deciding that they are distinct'.

These birds are mostly observed in small flocks upon the ground, where they feed upon the seeds of various grasses and plants. They are often seen in company with Red-backed and Mulga parrots. As a rule, they are quiet whilst feeding and can be approached quite closely before one notices the birds.

When flushed, they fly rapidly off to the nearest tree, whistling their call notes whilst in the air but falling silent again as they perch in the branches.

A hollow in a tree, frequently a dead one, is used for a nest. From three to seven white eggs are laid and the breeding season is from August to December.

## THE NEOPHEMA OR GRASS PARROTS

The Blue-winged Parrot, *Neophema chrysostoma*, is found from western N.S.W. and Victoria to southern South Australia, King Island and Tasmania.

In Tasmania the bird tends to be a summer visitor, arriving in September and departing again in February or March. However, a few birds have been observed remaining throughout the year.

In pairs or small flocks, this charming parrot frequents grassy country and sparsely wooded terrain.

They are inconspicuous amongst the long grass in which they feed and, although they communicate with soft twittering notes, these are so subdued that one might easily pass the birds by.

Gould writes admiringly of the bird and says that it is '. . . one of the most beautiful and interesting of the Psittacidae; for whether perched on the small dead branches of a low bush, or resting upon the stronger grasses, there is a grace and elegance in all its actions'.

Blue-wings are often quite fearless; threading their way through the grass they will permit a close approach before flying up with soft cries. They will settle again a short distance off or fly into a thick tree.

Oddly enough, these parrots show a great deal more timidity when in captivity. The Duke of Bedford writes in his book *Parrots and Parrot-like Birds*, 'the Blue-wing has the inveterate habit of killing itself by flying against the roof of its cage or aviary when suddenly frightened . . .'.

When displaying, (in captivity, so presumably in the wild?), the male bird draws himself up to his full height, the wings are lowered to display the blue on the wing and food is brought up from the crop. All the time he utters a call described as 'scroop-few'.

The food of these parrots appears to be obtained entirely on the ground, being the seeds of grasses and herbaceous plants.

Nesting is in a hole in a tree or stump, at the bottom of which, seven or eight eggs are laid without any nesting material. The breeding season is from October to January.

The Elegant Parrot, *N. elegans*, ranges from southern N.S.W. to western Victoria and South Australia north to the Flinders Range area. There is a south-western Australian population, from Esperance in the east to Moora in the north.

They are somewhat similar in habits and appearance to the foregoing species, frequenting open types of country where there is a plentiful supply of seeding grasses. Seemingly, unlikely spots such as salty marsh-country, even attract these parrots, if the rank herbage which grows in such places is seeding.

Elegant Parrots are nomadic, but not strictly migratory, as their movements are governed by the seasonal ripening of grasses.

Unlike the Blue-winged Parrot, they are usually very shy. When flushed they go up in a zig-zag flight, and if not seriously disturbed they may alight again, but more usually they mount into the sky and fly off at a considerable height. There is a 'pretty warbling call-note' which the birds utter whilst flying. In captivity the grass-parrots have a name for being delicate, but the Elegant Parrot is perhaps the most hardy of the group. Even in English winters it has survived in outdoor aviaries, without artificial heat.

These parrots nest in hollow timber or in the hollow limbs of trees. Four or five globular white eggs are laid,

and the breeding season is from August to October.

The Orange-breasted Parrot, *N. chrysogaster*, is distributed along the coastal areas of south-eastern South Australia, part of Victoria, Tasmania and more rarely in southern N.S.W.

As with the other grass-parrots, one usually comes across these birds in pairs or in small flocks.

This bird was first described in 1787 by Latham. Its 'relative place uncertain': meaning of course an exact location, as it was brought from Australia. The specimen described was sent to him by Mr. Thomas Pennant.

Pennant was the recipient of many of the specimens brought back by members of Cook's expeditions and it seems likely that this bird was one from Cook's third voyage.

Nowadays it is considered to be a rare bird, but in Gould's time it was considerably more common in certain localities. He came across it in the small islands in the D'Entrecasteaux Channel. He '. . . frequently flushed small flocks from among the grass, when they almost immediately alighted on the Banilla bushes around me, their sparkling orange bellies forming a striking contrast with the green of the other parts of their plumage . . .'.

They are swift runners, as are most of the grass-parrots. Most of their time is spent on, or near, the ground, seeking out the seeding heads of grasses and various herbaceous plants. Swampy coastal areas as well as the more likely plains-country are favoured habitats of these parrots.

They often become very fat, from whatever seeds they feed upon, even to the point of being difficult to skin; one earlier collector mentions that they 'were replete with fat, which had to be mopped up in the form of oil during skinning'.

Orange-breasted Parrots are very rare in captivity—they are not even mentioned in the Duke of Bedford's book on parrots, and it appears that no one has successfully bred and reared them in an aviary.

These parrots nest in a hollow limb or in the hollow of a tree: sometimes a hollow log on the ground may be utilised.

The breeding season is from November to January and four or five white eggs are laid.

The Torquoise Parrot, *N. pulchella*, is found in central Queensland and south to the Victorian border. In pairs or small flocks this beautiful and delicate parrot frequents open grassy country, intersected with stands of timber.

Like so many of our parrots it was once much more common that it is now. Gould suggested that anyone in the habit of travelling in outback N.S.W., '. . . will recognise in this lovely species an old favourite; for it must have often come under their notice; during my own rambles in that country my attention was constantly attracted by its beautiful outspread tail and wings as it rose before me'.

He also noted that these parrots evinced a partiality for stony rises and ridges, rather than the more heavily grassed flats.

When flushed, they fly off a short distance, perching in nearby trees until they feel confident in returning to their feeding. They are inclined to travel in smaller numbers—six to eight or so—than the Blue-winged and Elegant Parrots.

These birds were heavily trapped, even after being 'protected' by the law and were 'sold at fancy prices'. After reaching a very low ebb, numbers in some parts of northern N.S.W. appear to be picking up, and it may be that in our more enlightened times this beautiful parrot will be able to maintain its numbers. It is not only direct persecution such as trapping that depletes such ground-feeding birds as the *Neophemas*. Increase in grazing stock and the spread of farming deprive seed-eaters of the ripening grasses.

In captivity, (to their own misfortune as wild birds), Torquoise Parrots make charming and gentle inmates of an aviary. Perhaps because of the availability of food these birds breed freely in captivity, being even more prolific than in the wild. One brood each season appears to be the rule normally, but in an aviary up to three broods a year have been reared.

Oddly enough, having been popular as an aviary bird in the nineteenth century, the species disappeared from aviculture, both in Australia and abroad. In the early nineteen-twenties, some were obtained by Sydney breeders, and they are again well established in captivity. They stand up well even to European winters, especially if reared there.

In the wild, these parrots nest in a hollow limb or tree-trunk; sometimes a fallen tree or limb may be used. No nest is made, the four or five white eggs being laid on the wood-dust. The eggs vary in form from almost globular to elliptical. The breeding season is usually from August to December, dependent to some extent on food supply.

The Scarlet-chested Parrot, *N. splendida*, is distributed from western N.S.W. through northern South Australia to the coastal areas of the Great Australian Bight.

In Western Australia there are scattered populations; it is considered to be an inland bird, although there appear to be no records of it nesting in that State.

This beautiful parrot was first described in the *Proceedings of the Zoological Society*, London, in 1840, by Gould.

There was only a single Western Australian specimen available, although in 1845 several fine specimens were forwarded to Gould by the unfortunate Johnson Drummond who was murdered by a native in his party, whilst on a collecting trip for Gould.

Even in Gould's day this parrot was '. . . of a very shy disposition and nowhere very numerous'.

The next published account of the parrot is in Campbell's *Appendix to the Nests and Eggs of Australian Birds*, 1901, describing how a female and two eggs were taken from a nest in a mallee-tree. During the next five or six decades there were no additional records of the existence of this bird,

and it was considered by many ornithologists to be extinct.

This was not so however, and although it is rare, scattered populations inhabit the dry inland areas where patches of scrub occur to give it shelter. Often this parrot is found far from water. An account by somebody searching for this elusive parrot in 1936 describes their home-ground as 'spinifex-covered sandhills with stunted mallee gullies'.

The account goes on to say, 'this country in which they are found is waterless and I was puzzled to know how they obtained their drink, until one hot day . . . I saw one of them move its beak along the leaves and thereupon examined this bush and found that it had a very sappy round leaf . . . and on pressing it between my fingers a small drop of quite palatable juice was obtained from a leaf'.

These parrots are now frequently bred in aviaries, where they require care but they are not the most delicate of the 'grass-parrots'. The Duke of Bedford writes that adults of this species ' . . . must be kept separate from their own kind and from other members of their genus, but they are not, as a rule, spiteful with less nearly-related birds . . . Splendids are much less tempermental than Torquoises. The cocks are rarely wife-beaters and married couples do not indulge in dangerous and unseemly brawls'!

In the wild, these parrots follow a nesting procedure similar to that of the other *Neophema* parrots.

However, the nesting-hole is usually lower, and they select a ragged-edged hollow and do not chew around the edge of the entrance like other parrots, thus there are no indications to show that the hollow might contain a nest.

Four white eggs are laid and the only month recorded in the wild for breeding is September. In captivity the breeding period is quite a long one, aviculturalists recording it from August to January.

The Bourke Parrot, *N. bourkii*, is distributed from south-western Queensland and the far west of N.S.W. through Central Australia to northern South Australia and some parts of inland Western Australia.

This unusually coloured parrot was discovered by the explorer Mitchell on the banks of the Bogan River in N.S.W.

They are crepuscular and even nocturnal to some extent. Captain Sturt came across the bird in central Australia and wrote that it ' . . . was a visitant at the Depot and remained throughout the winter, keeping in the day time in the barren bushes behind the camp, and coming only to water. The approach of this little bird was intimated by a sharp cutting noise in rapidly passing through the air, when it was so dark that no object could be seen distinctly, and they frequently struck against the tent cords in consequence.'

The Bourke Parrot is considerably rarer than it was a century ago. Not being migratory, the alteration or destruction of their habitat by grazing stock and rabbits, seriously restricts the birds' numbers.

In places where they are still numerous enough, they may be seen in small parties of a half-dozen or so, feeding on the ground. Their diet is the seeds of grasses and other herbage. In the dry season larger flocks visit the diminishing number of water-holes—always during the night or at dawn and dusk.

The nest of this parrot is in the hollow of a scrubby tree from three to ten feet from the ground. Four or five eggs are laid, and are incubated by the female alone. She sits close, leaving the nest only for one short period each day. Whilst she is sitting, the female is fed (by regurgitation) by the male bird.

In captivity the Bourke Parrot is well established, having proved itself on the whole, much hardier and more easily managed than most other *Neophemas*.

In captivity the display of the cock bird is described as '. . . very graceful and pretty. He walks about round the hen, every now and then . . . making a slight curtsy and drawing himself up to his full height. Occasionally he raises his wings above his back after the manner of a bird stretching in order to show the blue on his flanks'. Presumably the display of wild birds would be much the same.

The Rock Parrot, *N. petrophila*, is a bird of the rocky coastlines. It is found along the coast and on the rocky islands of south-western and southern Australia, from Sharks Bay to south-eastern South Australia. In pairs or in flocks, which may be quite large in concentrated breeding areas, they may be seen amongst the rocks or feeding in nearby swampy country; they are very common in the vicinity of Port Lincoln and breed on 'The Brothers'.

This parrot was first described by Gould in 1841. The ornithologist, Gilbert, wrote of the bird that '. . . it breeds in the holes of the most precipitous cliffs, choosing in preference those facing the water and most difficult of access . . .'.

This interesting parrot is not particularly rare, although it is localised in its distribution. Its flight is swift and erratic and sometimes it may mount high into the air. They do not invariably nest in cliffs but may lay their eggs amongst loose rocks in the spaces or under boulders. One observer, writing of these birds nesting in Venus Bay says that, 'The eggs are often deposited on the bare rock, but when the birds can scratch a little earth or guano to lay their eggs on, they do so'.

The Rock Parrots may sometimes be seen a few miles inland where they go to find fresh drinking water.

The Rock Parrot is not particularly popular in aviaries, either here or in Europe. They are the least colourful of the group and are not easy to breed. A few Australian aviculturalists have had successes, both in nest boxes and in rocks on the floor of the cage.

In the wild these parrots are the plumpest of the *Neophemas* and have the reputation, when caged, of becoming fat and sluggish.

## SWIFT PARROTS

The Swift Parrot, *Lathamus discolor*, is in a genus on its own, and looks quite different from any of our other parrots. It is very long-winged, the primaries being twice the length, or more, of the secondaries. Its flight is indeed swift, much more so than the lorikeets with which it may often be seen feeding.

The Swift parrot is found from east-central Queensland where it is rare, down to Tasmania and as far west as Adelaide. They are usually seen in flocks, feeding in the flowering eucalypts, their presence being revealed by their continuous, distinctive warbling calls. Tasmania is considered to be the stronghold of this species.

The Swift Parrot is certainly a nomadic bird, its movements being governed by the honey-flow of the eucalypts, and it may also be migratory.

Gould writes that 'This elegant lorikeet is a migratory species, passing the summer and breeding season only in the more southern parts of the Australian continent and Tasmania and retiring northwards for the remainder of the year'.

Sharland, on the other hand, states in *Tasmanian Birds*, that it '. . . appears to go away for the winter; records of its appearance in Hobart relate to all months except May, June and July, Whether it migrates outside the State is not known but presumably it does'.

Gould says of the Tasmanian birds that it '. . . is very common in the shrubberies and gardens of Hobart Town.

It is frequently to be seen on the gum-trees bordering the streets, within a few feet of the heads of the passing inhabitants and so intent upon gathering the honey from the fresh-blown flowers . . . as almost entirely to disregard their (the people's) presence'.

The birds dash energetically about in flocks up to twenty or so, sometimes chasing each other and indulging in aerial exercises, apparently just for the sport of it. In flight they have a clinking note.

Nesting takes place in the hollow of a tree, usually down the 'spout' of a broken branch. The usual clutch is two white eggs, and the breeding season is from November to January.

## BUDGERYGAHS

The Budgerygah, *Melopsittacus undulatus*, is no doubt one of Australia's best known birds, especially in the various colours that have been aviary-bred. In the wild state this delicate little parrot is greenish, mottled with darker greens, black and browns.

Its distribution is inland Australia generally. At irregular intervals it appears in various coastal districts; perhaps because of bad drought conditions inland.

The typical habitat of the Budgerygah is open country scattered with trees and areas of scrub. It is a nomadic species, with a tendency to move south in late winter and early spring. This parrot was first described in 1840 from a specimen that was probably collected from the Parramatta district. It was seen in great abundance by Captain Sturt during his journey into N.S.W. Gould writes that 'This gentleman informed me that on the extensive plains bordering the Murrumbidgee he met with this lovely species in immense flocks, feeding upon the seeds and berries of the low stunted bushes . . .'.

The name of the bird is aboriginal and means 'good-bird' or 'good food'. A popular, anglicised version of the spelling is budgerigar. There are a number of 'aboriginal' ways of spelling the name also, such as: *Betcherrygah* and *Boodgereegar*.

Sometimes very large flocks have been seen in the interior and the bird is fortunately still quite common. They may be very tame if intent upon drinking at a water-hole or while feeding. Most of the time the birds keep up a constant chatter which can become quite monotonous if one is camped nearby.

They nest in colonies, many being found in the one tree, where every suitable hollow willl have its pair of birds. Some years, quite inexplicably, a flock will not appear at their usual breeding spot, but may return again the following year. They also may not appear as passing flocks, in a locality where most years they are common. These population movements are probably dependent on food supply. In good years it is quite possible that they breed twice, and perhaps in a bad year some Budgerygahs do not nest at all.

Gould introduced the species into England and within a few years they were being bred as readily as canaries. Many colour variations have since been developed, and a vast literature has grown up on the subject of their care and breeding.

In the wild they nest in a hole in a tree, and from four to eight white eggs are laid; the breeding season is usually from October to December.

The Budgerygah is a species that suffers very badly during a long drought when hundreds may be found dying around the dehydrating water-holes.

## GROUND PARROTS

The Ground Parrot, or Swamp Parrot, *Pezoporus wallicus*, is found along the coastal areas from southern Queensland to Victoria and west to south-eastern South Australia. On the other side of the Great Australian Bight there is a south-west Australian population. These rare and shy parrots are also found in Tasmania, which appears to be one of its strongholds.

Gould procured specimens himself on Flinders Island in Bass Strait where he '. . . found them breeding on the grassy plains which cover the greater portion of the island'. It is doubtful whether this parrot now breeds there. He also remarked 'whether the power of perching is entirely denied to it or not, I am uncertain, but I never saw it fly into a tree, nor could I ever force it to take shelter on the branches'. They do, however, perch on low branches or logs that are lying upon the ground.

They are shy birds, and when disturbed run off through the tussocky grass, so that they are seldom observed. Swamp Parrots have a strong scent and hunting dogs will 'point' at them as they will a quail or snipe.

The nest is a substantial platform of grass and rootlets under a tussock according to Cayley, but Gould says the '. . . five or six white eggs are deposited on the bare ground'.

Another description of the nest is where the birds have nipped out the centre of a tussock leaving a platform inside, on which a trampled mat of excreta was gathered.

The breeding season is from September to December.

The Night Parrot, *Geopsittacus occidentalis*, is even more rare, to the point where many ornithologists fear that it is extinct. Its range, theoretically, is Central Australia, northern South Australia and inland Western Australia. They may also have inhabited western Queensland and western N.S.W.

They are nocturnal parrots, hiding during the day in spinifex clumps or in 'the rocky caves of the ranges . . .'. When evening falls they usually fly direct to the nearest water, sometimes up to four or five miles in distance.They then go off to feed on the porcupine grass seeds, returning to drink two or three times before daybreak.

In 1875 they were "pretty generally distributed" in the interior, but unfortunately they have rapidly decreased since that date. Their note is described as 'a double note, harsh and loud'. They also have a strange croaking alarm-note, which may be heard when a bird is disturbed from its drinking spot; this closely resembles the loud note of a frog.

They are highly terrestrial birds, but their legs and feet are not well developed for running as are those of the Swamp Parrot; notably they lack the long hind claw.

# CUCULIFORMES

## Cuckoos and Allied Birds

The cuckoo family is fairly well represented in Australia, with fourteen species. There are about one hundred and twenty-seven species in the world and not all of them parasitize other birds; all our cuckoos, except for one, do have the family characteristic of laying their eggs in the nests of other birds.

Each female of any species will lay eggs of a similar colour, but from individuals, within the species, the egg colour and pattern sometimes varies greatly.

A number of eggs are laid by the hen cuckoo at about two-day intervals. Each one is deposited in a different nest, but only in the nests of one species, and usually one whose eggs most resemble her own.

The female cuckoo will usually have the selected nests under observation as they are being built and when the victim has laid an egg or two, the cuckoo flies to the nest, removes one of the clutch, lays her own egg in its place and flies off with the stolen egg.

In the case of birds with domed nests being chosen, it was believed that the female cuckoo laid her egg on the ground and then deposited it with her bill through the small entrance to the nest. Observation suggests that this never happens. In fact, the cuckoo usually props herself, with wings and tail spread for support, against the nest entrance, and ejects her egg into the nest.

In the case of our Shining Bronze-Cuckoo, which usually lays in the domed nests of such birds as wrens, the cuckoo forces her way into the nest, sticking her head through the far wall. After laying her egg, she flies off through the hole she has made. The owners of the nest return and unconcernedly repair their damaged nest.

On hatching, the well-known procedure develops, where the young cuckoo ejects the other young birds or any remaining eggs, by wriggling beneath them and hoisting them over the edge on its shoulders.

If by chance two cuckoos' eggs are laid in the same nest

and they hatch out together, the two blind and naked chicks struggle against each other for some time without either bird being able to toss the other over the edge of the nest. After three days or so, the instinct to clear the nest of competition dies, and the two cuckoos live amicably together.

## CUCKOOS

Perhaps our most 'typical' cuckoos are the two species in the genus *Cuculus*. The Pallid Cuckoo, *Cuculus pallidus*, is one of the most common of the Australian cuckoos, and it is found throughout Australia and Tasmania where suitable habitats occur.

PALLID CUCKOO 12 in.

They are migratory birds, appearing in spring in southern Australia and moving northwards again in autumn. A few birds have been recorded as remaining in the south throughout the year.

These cuckoos are very vociferous when they first come south and the loud whistling call—a run of ascending notes with a rather plaintive sound—is a familiar sound to many people. It keeps up this call for hours at a time on hot spring mornings, and such local names as 'Scale-bird' and 'Brainfever-bird' are some indication of the persistence of this bird's calls.

The food of the Pallid Cuckoo is insects of various kinds and it also fulfils a very useful function in eating large numbers of hairy caterpillars which few other birds will touch.

Foster-parents for the young of these cuckoos are very diverse, more than eighty species being recorded. They do, however, usually choose open, cup-shaped nests. Many species of honeyeater are parasitized, as well as some robins and flycatchers, wood-swallows and many others.

The egg of the Pallid Cuckoo is a pale pinkish flesh-colour, some quite plain, and others with a few darker spots. The breeding season is from September to January.

It is only the male bird which has the characteristic ascending whistle, the call of the female being a hoarse 'kheer' sound. This is the case with most cuckoos: the male has the typical and usually loud call of the species, whilst the female is silent or has a simple harsh cry.

The Oriental Cuckoo, *C. saturatus*, is a bird of South-east Asia, Japan and India that migrates down through the islands to Australia. Although the illustration of this bird depicts it at the nest of a northern Australian honeyeater, it is actually unlikely that the Oriental Cuckoo nests in this country. These birds are closely related to the European Cuckoo, which calls 'cuck-coo,' and is the bird from which the family derives its name. In Australia the Oriental bird has a call, 'kuk-kuk-kuk', and a harsh, low chirring note. In Asia, its spring call is described as 'pon-pon' and is no doubt somewhat similar to the European bird's 'cuck-coo'.

They do not appear to be particularly common birds in Australia, and are usually shy. If they are intent on feeding on a swarm of caterpillars, however, they will sometimes ignore an intruder.

Although a migratory species, they have been recorded in northern Australia in most months of the year. The bulk of our birds arrive in about January and have departed by the end of May. Their Australian range is north-eastern Australia.

The bird is parasitic, and lays whitish or pale brown eggs with small spots and speckles.

The Black-eared Cuckoo, formerly *Misocalius osculans*, has recently been placed by some ornithologists with the bronze cuckoos, and called *Chrysococcyx osculans*. Its flight is similar to that of the bronze cuckoos, perhaps giving a clue to its true position in the classification system.

This bird is one of the rarest of our cuckoos and is found in small numbers through the inland parts of the continent, although in Western Australia it is recorded as '. . . a not uncommon inland cuckoo'.

Not a great deal is known about its life history but its food is insects, caught on, or close to, the ground. It is not a vociferous cuckoo, but two of its calls have been recorded. One call is a drawn-out fading whistle, 'peer' repeated up to fifteen or so times. A second call is rendered as 'pee-o-wit-pee-o-weer', which may have two or three repetitions.

This cuckoo lays a dark-brownish egg and parasitizes birds which lay similarly dark eggs, such as the Red-throat. Other foster-parents recorded are the Speckled Warbler, (probably the most favoured), the Yellow-tailed Thornbill and the Sky Heath-wren. It is interesting that the Heath-wren does not lay a particularly dark egg and the eggs of the Thornbill are white or pale-pink—quite different from those of the cuckoo.

The breeding season is from August to January in eastern Australia, and in March in the Centre.

YOUNG ORIENTAL CUCKOO AND FOSTER PARENT

WHITE-THROATED HONEYEATER 4½ in.

ORIENTAL CUCKOO 13 in.

The genus *Cacomantis* contains three cuckoos in this country. The Fantailed Cuckoo, *Cacomantis pyrrhophanus* is a fairly common bird through most of its range. It is found from Cape York down eastern Australia and across to the Eyre Peninsula. It is common in Tasmania and there is a population in south-western Australia.

These cuckoos are mainly birds of the forests and scrub country, although, they may be met with in gardens sometimes and in open park-like habitats.

Their call is a descending trill probably as often heard as the rising scale of the Pallid Cuckoo. It is a drowsy, summery sound with a plaintive quality, and is quite unmistakeable.

Fantailed Cuckoos are largely migratory, or at the least, nomadic, moving northwards after each breeding season. The south-western Australian birds do not migrate outside their range, but merely undertake seasonal movements within it. A few birds in various parts of the country also remain in the same vicinity throughout the year.

Fantailed Cuckoos have the typical cuckoo-flight, direct and rather sparrowhawk-like. When the bird lands the tail is elevated, almost as if to maintain balance.

As well as the descending trill, there is said (by Sharland) to be another call that resembles the call of the European cuckoo '. . . more closely than do any of our cuckoos' calls. . . the listener can with a little imagination hear the drawn out double note that suggests the call of the English bird'. They can quite often be heard trilling during darkness in the spring.

A large number of foster-parents is known: about fifty have been noted. These are usually birds that are considerably smaller and that build domed nests. More rarely, they will lay in the open nests of such birds as silvereyes. In the introduction to the Cuculiformes there is a description of how such a large bird as this cuckoo deposits its egg in a small domed nest.

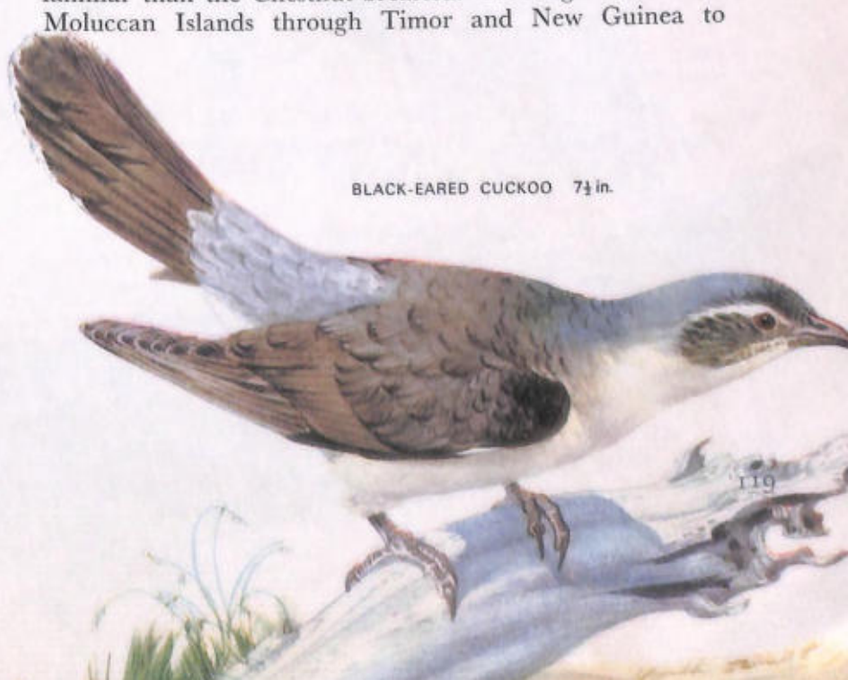
The breeding season is from August to December, and the egg is a dull white with small spots of purplish-brown, sometimes forming a vague zone at the larger end.

The Chestnut-breasted Cuckoo, *C. castaneiventris*, is, by contrast to the last bird, rather rare and confined in Australia to the north-east of Queensland. This cuckoo is also found in New Guinea.

Deep tropical scrub is the habitat of these birds and very little is known of their life history or general habits. They feed on insects which are often caught on, or near, the ground and the call of these cuckoos is described as a single 'chir-rip' uttered spasmodically 'in a whistling fashion'.

No nest is built, the species being parasitic. There is no authentic record of the egg, neither has the breeding season been recorded in this country.

The last bird in this genus, the Brush Cuckoo, *C. variolosus*, is another northern cuckoo, but rather more familiar than the Chestnut-breasted. Its range is from the Moluccan Islands through Timor and New Guinea to



BLACK-EARED CUCKOO 7½ in.

Australia. On this continent it is confined to coastal northern and eastern districts.

This cuckoo is a migrant, like many of its relatives, arriving in Victoria and N.S.W. during October and flying north again in February and March.

The call is a strange, rather mournful sound: six or seven descending notes, uttered with deliberation and increasing in volume. The bird is vociferous on warm spring and summer nights.

The food of this bird is insects of various kinds and hairy caterpillars, which some cuckoos will eat, but few other birds bother with.

Open cup-shaped nests are chosen by this bird for parasitizing—species such as robins and flycatchers being common hosts: over thirty species have been listed as hosts to this cuckoo. The egg is white with faint purplish-brown and lavender markings, and the breeding season is from October to January.

The genus *Chalcites*, the bronze cuckoos, is the largest group of Australian cuckoos. They are widely distributed over the continent and, except for one or two species, are fairly common.

The Rufous-breasted Bronze Cuckoo, *Chalcites russatus*, is found in New Guinea and eastern Queensland from Cape York Peninsula to the Dawson River. It is a bird of the open forests and, on the coast, it also lives in the mangroves.

This small cuckoo usually chooses the nests of *Gerygone* warblers in which to lay its eggs. Its most common call is a trill of 'silvery notes', rapidly uttered, and repeated many times until suggesting the stridulation of an insect.

There are about a dozen species recorded as foster-parents, and the cuckoos' eggs are a light-buff or deeper olive-bluff, freckled and spotted with darker-brown. The breeding season is from September to January.

The Narrow-billed Bronze Cuckoo, *C. basalis*, is found throughout most of Australia, except Cape York Peninsula, wherever conditions permit. This cuckoo is also found in Tasmania, the Malay Archipelago and the Aru Islands.

This is a cuckoo of the open forest and heathlands and it sometimes also visits country gardens. In the main, it is a migratory bird, although some remain in their haunts throughout the year. The bulk of the birds arrive in early spring and depart again in about March. Their exact migration routes and destinations are not yet known.

They may often be seen perched on a high dead twig at the top of a bush. This is often the singing post from which the handsome little bird utters its call. These notes are a high-pitched, rather mournful whistle, piping down the scale. During the breeding season the birds often call at night. Insects and caterpillars are the birds' staple diet.

There are about sixty-five species of foster-parents recorded. Both domed and open nests are chosen, but domed nests near the ground seem to be preferred. The egg is pinkisk with small red spots, and the breeding season is from July to December.

Shining Bronze Cuckoos, *C. lucidas*, are only birds of passage in Australia. They are a common breeding species in New Zealand, but have not been recorded as nesting in Australia.

The bulk of these cuckoos make the 2,000-mile journey to their wintering grounds in the Solomon Islands over the open Pacific Ocean. A few birds, however, reach our eastern coastline and follow it up on their way north.

This ocean-spanning journey is a considerable flight to be undertaken twice a year by a bird only about 6 inches long. More remarkable is the fact that the young 'birds of the year' follow some time after their parents. Instinctively they find their way north over the trackless ocean to the relatively small area of the Solomons. They have even occasionally been recorded from Macquarie Island in the sub-Antarctic.

Like the other bronze cuckoos, they are parasitic, various insectivorous birds being chosen as foster-parents. The eggs are an unmarked olive or bronze colour and they breed in the New Zealand spring and summer.

The Little Bronze Cuckoo, *C. minutillus*, is a bird of northern Australia. It is found from Derby in the west to the Leichhardt River in Queensland. It seems likely that this cuckoo would also be found in western Cape York Peninsula.

This bird has been rarely observed and little is known of its habits, except that it frequents open forest country and the coastal mangroves.

Four species of *Gerygone* warblers have been recorded as foster-parents. The egg is an unmarked greenish-olive, and the breeding season is in the spring and summer.

The Golden Bronze Cuckoo, *C. plagosus*, is a common bird, and it is found throughout a large part of Australia where suitable habitats occur.

Its range is eastern and southern Australia, from Cape York to south-eastern South Australia. Separated by the dry centre, there is a population of these cuckoos in south and mid-western Australia. They are also found in Tasmania.

Outside Australia they range to New Guinea, the Lesser Sunda Islands and the Bismark Archipelago.

This cuckoo is a migrant to the southern parts of our continent, arriving to breed in the spring and departing again before the winter.

In Western Australia, the earliest call recorded is May the fourth, and the bird leaves for the north in February. In N.S.W. a few birds have been recorded as remaining the whole year.

It is a useful bird, being a great insect eater and destroying large numbers of injurious caterpillars.

The call note is vigorous and has been syllabised as a repeated 'pee-pee-pee' ending with a drawn-out 'pee-er'. The bird usually calls from a dead twig at the top of a bush or tree. Sharland describes it as 'melodious and active when mating and indulging in noisy demonstrations in seeking breeding territory . . . Short flights through the trees by several birds, in pursuit of a mate or in driving off intruders when a territory has been selected, make this bird much more animated than other cuckoos. It often becomes worked up to fever-pitch with excitement, which is expressed in loud calls and whistling notes'.

The Western Australian population of these cuckoos migrate to such places as the Lesser Sunda Islands, whilst the eastern population appear to go to New Guinea on the whole.

About sixty-five species have been recorded as foster-parents, and these are mostly birds that build domed nests. Yellow tailed Thornbills are a popular host, Fairy Wrens, the Spotted Scrub Wren and the Brown Thornbill are also recorded as common hosts in Western Australia: no doubt this holds true in the eastern States.

The egg is a pale greenish-olive or a bronzy-brown colour If the egg is rubbed with a wet finger, the colouring comes off, revealing a pale-blue shell. The breeding season is from August to December.

The Channel-billed Cuckoo, *Scythrops novae-hollandiae*, is found from the Kimberley area in north-west Australia through the northern parts of the continent and down to N.S.W. and north-eastern South Australia. It is considered to be an accidental wanderer to Tasmania. This cuckoo is also found in New Guinea and other islands to our north.

A heavily-built bird, with an enormous, deep bill,

this is our largest cuckoo. Two of its local country names are 'toucan' and 'hornbill' and the way the heavy-looking bill grows out in an almost straight line from the top of its head, is certainly reminiscent of these tropical birds. Why a cuckoo should evolve such a large beak is something of a puzzle.

This cuckoo feeds on 'almost anything edible' but its main diet consists of insects, native fruits and berries.

They may be seen in pairs or, unlike most cuckoos, in small flocks. Scrubby country and open forest are the favoured habitats. These cuckoos are migrants from the north and reach the southern limits of their travels during September and October, departing again during March.

The call is a loud, screaming cry, which may be uttered from a perch or when the bird is in flight. Its calling is popularly supposed to portend heavy rain, which has given rise to such nick-names as 'flood-bird' and 'storm-bird'.

It is a parasitic species and six foster-parents have so far been recorded: popular hosts are crows and currawongs. This cuckoo is unusual in that it often lays two, or even more, eggs in the one nest. What probably transpires in this case, when the young hatch out, is described in the introduction to this order. Females are said to be often active at dawn and through the night.

The eggs are a dull-whitish colour, marked with browns and lavender. The breeding season is from October to December.

The Koel, *Eudynamys orientalis*, is distributed from the north-west of Australia across the continent and down the eastern states to north-eastern Victoria. Its range also covers New Guinea, Timor and the Moluccan Islands.

These are cuckoos of the forest and big brush country. They migrate to Australia, arriving here from the north in September and departing about March.

This bird has a very distinctive call of 'coo-ee' or 'ko-el'; loud and clear, and the cry has rather a pleasant quality. However, when the bird calls at night, which it frequently

RUFOUS-BREASTED BRONZE-CUCKOO
5½ in.

LITTLE BRONZE-CUCKOO
5½ in.

NARROW-BILLED BRONZE-CUCKOO 6 in

GOLDEN BRONZE-CUCKOO
6 in.

SHINING BRONZE-CUCKOO
6 in.

CHANNEL-BILLED CUCKOO
24 in.

BRUSH CUCKOO
9 in.

CHESTNUT-BREASTED CUCKOO
9 in.

FANTAILED CUCKOO
10 in.

does, its voice, which during the day has the air of a friendly hail, somehow becomes more eerie. This cuckoo also has a call described as 'wurra-wurra'.

The Koel is much persecuted by other birds, especially friar-birds which often serve as its fosterers. Indeed, the sight of most cuckoos engenders in other birds much the same reaction as the appearance of a hawk. A bird of prey that is 'off duty' as it were, must fly and generally conduct itself differently from one which is hunting, for in the former case the small birds dash out and 'mob' the passing bird of prey until it departs from their territory.

The mobbing of cuckoos is probably an essential link in the pattern of their existence. For whilst the male is attracting attention, and being driven from the area, the more secretive female is slipping through the undergrowth to lay its egg in the nest of the unsuspecting hosts.

The food of the Koel is native fruits and berries and it shows a strong preference for figs and mulberries but, insects are also eaten.

There are about a dozen recorded foster-parents; the larger honeyeaters such as friar-birds are often parasitized as are also the mud-larks and the orioles. The egg is a pinkish or reddish-salmon colour, marked with spots and streaks of purplish-red. The breeding season is from October to January or February.

The Pheasant Coucal, *Centropus phasianinus*, or Swamp Pheasant, as it is lately being called, is the least typical of our cuckoos. It is a terrestrial bird in the main and certainly resembles a pheasant-like creature rather than an arboreal bird.

They are very shy and wary birds, keeping to dense swampy cover most of the time. If flushed, they will fly up into a tree to eye the intruder; a closer approach causes the bird to fly off to the next tree perhaps, but then it soon drops back to hide in the sedgy cover below.

The distribution of this cuckoo is northern Australia, down the west of the continent as far as the Minilya River and down the east of the continent as far as the Conjola district in N.S.W. Occasionally they have been recorded in the south-east corner of Victoria, around Mallacoota Inlet. It is chiefly a coastal species.

There are two colour phases of this bird, a dark blackish and chestnut variety (illustrated) and another type which is lighter, with brown plumage where the other bird is black, and of a paler colouration generally.

The call of this cuckoo is a loud 'coop-coop; coop-coop-coop', with a pause after the first two notes and the rest running rapidly on. It has been described as a frog-like call and also likened to the sound of water gurgling from a bottle. They also have a harsh, scolding alarm note.

As well as being atypical in its appearance, this bird is unique in being the only Australian cuckoo that builds its own nest. This is made by pulling together the tops of a tussock and hollowing out the inside: extra grass-blades and leafy twigs may be woven into this globe-like structure. There is a hole in opposite walls of the nest and the Coucal's bill projects from one side whilst its long pheasant-like tail protrudes from the other. A path of fresh green leaves is often made which leads up to the nest. These leaves are apparently renewed when they begin to wither and turn brown.

Three to five dull-white eggs are laid on a nest-lining of leaves. Both birds take part in the nesting activities. The breeding season is from September to March, although in Western Australia it is recorded that 'Nesting may take place at odd times of the year, but the usual time is from November to February'. This variation would no doubt be associated with water conditions in its swampy habitats.



# STRIGIFORMES

## Owls

The classification of Australian owls is still in a rather unsettled state. Considered broadly, there is no problem. Owls, on a world-wide scale, have been divided by some students into *Tytonidae*, the Barn Owls, and the *Strigidae*, or Typical Owls; although other workers lump them together in a single family. In Australia we have clear-cut representatives of both groups. But when it comes to a discussion about species, opinion is divided. The *Tytonidae*, until recently, have been divided into six species, but now it is considered by most taxonomists that the Cave Owl is but a sub-species of the Masked Owl.

The Boobook Owls, *Ninox*, present a more contentious problem. Formerly there were five of these given status as full species. An examination of skins will show a cline, or gradual change, between what were considered northern species, and what were named as southern species. The birds become greyer in the south and more reddish in the north; but the problem is exacerbated by greyish birds occurring in the north, and by finding that a few red birds have been collected in Victoria and N.S.W. The size of these owls also tends to add to the problem, as a bird collected from a given locality might be half the size of another specimen from the same area.

The treatment in this book will take it that there are five 'Barn Owls', with the Cave Owl as a sub-species and, that there is but one Boobook Owl, with various geographic, although overlapping, forms.

### BARN OWLS

The Barn Owl, *Tyto alba*, is the 'type-bird' of this group and is found in only slightly varying forms in many countries of the world. It is the owl which is usually the most closely associated with man: often nesting, as its name suggests, in farm buildings and other sites where its rodent food might be abundant. The strange facial disc of these and related *Tyto* owls gives the birds a weird and delicate expression; sometimes indeed, a photograph captures a look of slant-eyed beauty that would be hard to equal in the bird world.

Remains of an enormous species of Barn Owl, twice the size of the present birds, have been found in cave deposits in the Bahama Islands. Dug up with the remains of these owls were fossil remains of large rodents. The owls, were no doubt, gradually reduced to their present fifteen inches or so as their large prey died out.

Some owls are somewhat or entirely diurnal, but the Barn Owl is strictly a bird of the darkness. I have occasionally seen a bird at dawn, caught by the light, on its way back to a roosting spot. They are very local birds in their habits, using the same spots to hide in by day, and returning year after year to the same nesting site. Presumably they also mate for life.

Experiments have shown that Barn Owls appear to hunt more by ear than sight. Captive Barn Owls, in a totally blacked-out room were watched with infra-red lamps. Mice on the floor were ignored whilst stationary, but as soon as they stirred, rustling the leaves scattered on the floor, the owls pounced with unerring accuracy.

The Australian representative of the Barn Owls is found throughout the continent and Tasmania, wherever habitats allow. It usually inhabits forest land or lightly timbered cultivated country.

Barn Owls have a number of calls; an odd assortment of clucking and snoring sounds and a long drawn out, unearthly scream. Even the most hardened bushman or

naturalist can be thoroughly startled by this hair-raising shriek.

As well as rodents, this owl feeds on bats, insects and reptiles. It also takes small birds. One of these owls will sometimes fly along an ivy-covered wall, or similar site, brushing the foliage with its wings to flush the sleeping sparrows and other small-fry. If a bird is unwise enough to blunder out, it is soon snatched up in the owl's powerful talons.

The nest site is in a hollow of a tree trunk or limb; alternatively, they will nest in farm buildings, church-towers and other large isolated structures.

Three to seven white eggs are laid and the breeding season is generally from April to October.

The Masked Owl, *T. novae-hollandiae*, is a more heavily built bird than the Barn Owl and is darker: the facial disc is a creamy-brown compared with the almost white face of the above species.

They are found in forest country generally, throughout the continent. They appear to be strictly nocturnal, hiding and sleeping during the day in hollow trees or in thick dark foliage.

If this, or any of the other owls, is discovered by small birds, they usually mob it, pestering the dozing owl, and often forcing it to go off and find a better hiding place.

The call is a screeching cry, similar to, but more powerful than, the Barn Owl's. They feed on small mammals and reptiles and, like all the *Tyto* group, are considered to be beneficial to man in their depredations amongst rodents.

Three pearly-white eggs are laid in the hollow branch or trunk of a tree: often at a considerable height from the ground. The breeding season is from about April onwards, but appears to depend somewhat on food supplies.

The Cave Owl, *T. novae-hollandiae traughtoni*, is a sub-species of the Masked Owl, found on the Nullarbor Plain. This bird differs from its relative in being somewhat paler on the back and having less spotting on the underparts.

The Cave Owl lives in the blowholes and limestone cave entrances on the Nullarbor, emerging at night to hunt for lizards and small mammals.

No nest is made, the two white eggs being laid on the sand of a ledge in a blowhole or cave. The breeding season appears to be from August to December.

Tasmanian Masked Owls, *T. castanops*, are the Tasmanian and Bass Strait variety, and have been given full specific status.

Sharland states in *Tasmanian Birds* that the 'chief difference seems to be the colour of the facial disc . . .'. In fact, some of the skins examined indicate that some at least, of the Tasmanian birds are very much darker and more orange all over; this is particularly noticeable on the breast. The facial disc is indeed darker, being a deep coffee-brown, whilst in the mainland species, it it quite a pale buffish-white.

But, as with many Australian owls, the problem is not clear cut, as there are light forms of the Tasmanian bird which are '. . . almost white . . .' (Sharland). The female of this Masked Owl is considerably larger than the male, and a good-sized specimen may be only a little smaller than a Powerful Owl.

A variety of rasping, hissing notes may be uttered and the bird also has a loud screaming cry, heard apparently, when the owl is hunting. The food is small mammals and birds.

The nest is usually a hollow in a tree, but may sometimes be in a cave. Two or three creamy-white eggs are laid and the breeding season is recorded as '. . . probably regulated by food supplies'.

The owl is stated to be not shy, and is approachable '. . . when perched at dusk'. I have found most owls to be relatively fearless when discovered in their day-time hiding places. It appears that they would rather face an intruder, up to a point, than a daylight flight.

The Sooty Owl, *T. tenebricosa*, is found from eastern Queensland to eastern Victoria and occasionally on Flinders Island in Bass Strait. This owl also ranges to New Guinea. It is not a common bird and very little has been recorded of its habits and life history.

Sooty is an apt name for it, as the bird is considerably darker than any other of the *Tyto* group. With its deep sooty-brown back and ashy-brown front, it should not be confused in the field with any of its close relatives.

The nest is a hollow in a tree, and three white eggs are laid. The breeding season usually starts about July, but appears to vary according to the availability of food.

The Grass Owl, *T. longimembris*, as its specific name suggests, is a very long-legged bird. Most of the *Tyto* group have a delicate 'knock-kneed' look, and in the case of the Grass Owl, this is very pronounced, giving the bird a most effete appearance.

It is a rare bird, which occurs from the Northern Territory down the eastern states to Victoria. These owls are considered to be rare wanderers to Western Australia, although, as D.L.Serventy points out, the difficulties inherent in observing night birds make it difficult to assess the population of a rare owl.

The Grass Owl is also found northwards in India, China, and many of the island complexes to the north of Australia.

Its habitats are the well-grassed downs and open country in coastal districts. They hunt by night and, during the day they rest and hide in a 'squat' under a dense grass tussock.

This owl preys on large insects, small mammals, reptiles and frogs. Four white eggs are laid in a hollow in, or under, a tussock. The breeding season is from May to July.

## TYPICAL OWLS

All our remaining owls are in the genus *Ninox*. This group contains about eighteen species, spreading from eastern Asia down through the islands to Australia. They are known broadly as Hawk-owls, a name they share with the Hawk-owls of the sub-Arctic, which are in a different genus.

The best known of the group in Australia, is no doubt the Boobook Owl, *Ninox boobook*, which is named after its cry of 'boo-book' or 'more-pork'. It is also known by many country people as the 'Mopoke'. These owls are distributed throughout most of Australia where suitably wooded habitats allow.

They are night hunters, and during the day, rest and sleep in the hollow of a tree, a rock crevice, or deep in thick foliage. They are often quite common in towns, where they may be seen hawking at the insects attracted to street-lamps, or heard in parks and large gardens. Apart from insects, the food of this owl is small rodents and birds. As well as the well-known call, the bird has a cry which rather resembles the mewing of a cat.

The nest is in the hollow limb or trunk of a tree, and three, or more rarely four, round white eggs are laid. The breeding season is from September to January.

Because of its habit of preying on mice and other rodents, the bird is considered to be helpful to man: and certainly when one is camping in the wilds their call, often in duet, is rather comforting.

Beneath the owl's roosting place there may often be found pellets of bones and other indigestible parts wrapped neatly in a felt of fur and feathers. These pellets are regurgitated by all owls, and their presence often gives the nesting

or roosting site away. They are also useful to the ornithologist in that they indicate what the owl has been feeding on. Occasionally, examination of these pellets leads to the discovery of some small mammal hitherto unknown within the locality.

There are three other Boobook Owls, all of which are now considered to be but forms of *Ninox boobook*. The Spotted Boobook, *N. novae-zealandiae*, is perhaps the most distinct form. As far as can be gathered from skins in the National Museum in Melbourne, the Spotted Boobook appears to be a consistently smaller bird, often down to half the size of the other *Ninox* owls. As its name suggests, it is well spotted on the back, crown and nape, with the breast-markings also being very well defined.

This is a bird found in Tasmania and the islands of Bass Strait. It is quite common, and is similar in habits to the other boobooks. It is said to hunt chiefly at dusk, presumably to prey on small birds that have not yet retired for the night. In Tasmania they are frequently '. . . seen in cities, hunting sparrows in parks and streets'.

The nest is in the hollow of a limb or tree-trunk, and two or three round white eggs are laid. The breeding season is from October to January.

*Ninox lurida* is the name given to the Red Boobook Owl, although it does not seem that this bird can be clearly separated from its relatives. The fact that red birds occur in the north (its range is given as north-eastern Queensland) is quite true—and they predominate. But amongst them will be found a number of browner 'southern' forms. All kinds of intermediary plumage stages exist as one moves south until eventually the browner birds predominate, although with a few very red ones existing even in Victoria.

The northern Boobooks inhabit dense forest and big scrub. They remain well hidden during the day emerging at dusk to hunt in the clearings for insects, rodents and small birds.

Neither the nest, eggs, nor breeding season of the Red Boobook has been recorded.

The Northern Boobook, *N. ocellata*, is yet another variety of the basic type. It tends to be a lighter bird with a whiter face than the other boobooks. It is also perhaps slightly smaller than the southern variety.

Its range is from north-western Australia to northern Queensland. Open forest, usually in the vicinity of watercourses, is its favoured habitat. Small mammals, birds and insects comprise this owl's food, which it hunts in much the same manner as the other owls.

Owls are quite frequently found dead on the road, having been hit by passing vehicles. Such a find can at least be classified as *Tyto* or *Ninox* even by the most amateur bird-watcher. All the *Tyto* group (Barn Owls) have a serration along the inner margin of the middle claw, which the *Ninox* owls lack.

Fortunately for the bird-watcher and, perhaps, for the professional taxonomist, there is no confusion about the other three owls in the genus *Ninox*.

The Barking Owl, *N. connivens*, is also often called the Winking Owl, and might well (although perhaps flippantly) have been called the Conniving Owl, considering the derivation of its Latin name.

This owl appears to be a strictly nocturnal bird. During

ZOOLOGICAL GARDEN
CALCUTTA
ALIPORE

the day it hides away in the hollow of a tree or deep in thick foliage. It has a barking cry that has been written 'wuk-wuk', and it is now thought that it is this bird that utters the screams once attributed to the Powerful Owl. So appalling and blood-curdling is this nocturnal shriek that many a time people have rushed into the darkness to look for the murdered woman. In some country districts the originator of the cry has come to be known as 'the murder bird' and 'screaming woman bird'.

The sound no doubt has a pretty demoralizing effect upon the small mammals that are the owl's prey. Barking Owls also take insects and a few small birds.

A hollow in the limb or trunk of a tree is the usual nesting site; although sometimes a rabbit burrow is utilised. Two or three white eggs are laid and the breeding season is from August to October.

Rufous Owls, *N. rufa*, are northern Australian birds. Their range extends from north-western Australia across to north-eastern Queensland and as far south as Rockhampton. Rufous Owls also inhabit New Guinea.

Not a great deal of observation has been made of this bird. During the day they hide away, usually in the dense growth bordering water-courses. They hunt at night through the more open forest.

The call note of this bird is traditionally owl-like, a low 'hoo-hooo', repeated at intervals. The diet of this bird appears to be mainly insects and small mammals.

Nesting takes place in a hollow in a tree and two or three white eggs are laid. The breeding season is from July to perhaps September.

The largest of our owls is the Powerful Owl, *N. strenua*. This bird is found from south-eastern Queensland to eastern and southern Victoria. Its normal habitat is the big scrub, and brush-filled gullies of mountain country, but I have seen one in the light scrub only a mile or two back from the coast at Mornington, Victoria. Also, a few years ago, a Powerful Owl spent some time in the Botanic Gardens in Melbourne, much to the delight of the local naturalists.

They are large, heavy-looking birds with rather small heads in proportion to their bodies. Like other owls, they appear short-necked, although in fact, owls all have rather long necks under their bulky feathering. Their necks are also very pliant; having their eyes in front of their heads gives the owls the advantage of binocular vision, but they have to turn their heads to look at anything that is to one side or behind them. An owl is able to swivel its head completely round and stare down its own back.

It is this ability and habit that has given rise to the old story that, if one walks around an owl sitting on a stump, it will continue turning its head to keep one in sight, until it wrings its own neck.

The call of the Powerful Owl is a rich, deep 'who-whoo'. It also has a number of murmuring and bleating calls. The wild 'murdered-woman' shrieks hitherto attributed to this bird are now considered to be made by the Barking Owl.

Powerful Owls catch possums and gliders, which constitute their main diet. In some localities, they also take a number of rabbits and a few small birds.

The nest site is a hollow in the trunk or limb of a large tree. The tree chosen is often on the side of a steep, well wooded hillside or gully, and the nesting-hole may be eighty feet or so above the ground.

Two white eggs are laid and the breeding season is from May to September.

# CAPRIMULGIFORMES

## Nightjars and Allied Birds

This order of strange-looking, although beautifully plumaged, birds is well distributed throughout most countries in the world. We have three groups in Australia: the nightjars, the frogmouths, and the owlet-nightjar.

The nightjars are the most numerous and widely spread about the world; about sixty-seven species are found in most countries except New Zealand, the Frigid Zones and the oceanic islands.

We have three nightjars in this country. All are nocturnal, hunting insects at dusk and at night by hawking after them on the wing. In Europe and America (and to a lesser extent in Australia) the nightjar is also known as the Goat-sucker. This derives from its Latin name, which in turn stems from the very ancient fallacy that these birds milked goats with their large mouths.

They are noisy birds and have a variety of clucking, whirring, chuckling and chopping sounds. It is sometimes the habit of nightjars to sit along a branch during the day, where their mottled plumage effectually camouflages them as part of the tree. Others rest by day on the ground, where their plumage is equally effective in hiding them. Often a bird will not fly up until almost walked on, so confident are they of their disguise. Nightjars also nest on the ground amongst the dead leaves and other debris. Although being terrestrial to this extent, these birds have very weak, almost useless, legs and feet. On the ground they might shuffle along for a few inches, but if they need to move even a foot or so, they prefer to fly. On the underside of the middle claw of a nightjar is a comb or row of serrations. The exact purpose of this is not known, but it is thought to be used in preening and dressing the bird's plumage.

For many years it was thought that some insectivorous birds escaped the winter not by migrating, but by hibernating. Even such an excellent field naturalist and close observer as the great Gilbert White was under this impression. White wrote a natural history of his village, Selbourne and its environs, in the south of England. He was born in 1720, and in spite of many of the peculiar ideas, superstititions and thoughts concerning natural history in those days, he managed to remain an accurate and informed observer for the most part.

The seasonal appearance and disappearance of the insect-eating birds puzzled White as it did many before and after him. As he writes in his book, 'If these little delicate beings *are* birds of passage, how could they feeble as they seem, bear up against such storms of snow and rain, and make their way through such meteorous turbulences as one should suppose would embarrass and retard the most hardy and resolute of the winged nation? Yet they keep their appointed times and seasons . . . The withdrawing and reappearing of the short-winged summer birds is a very puzzling circumstance in natural history!'

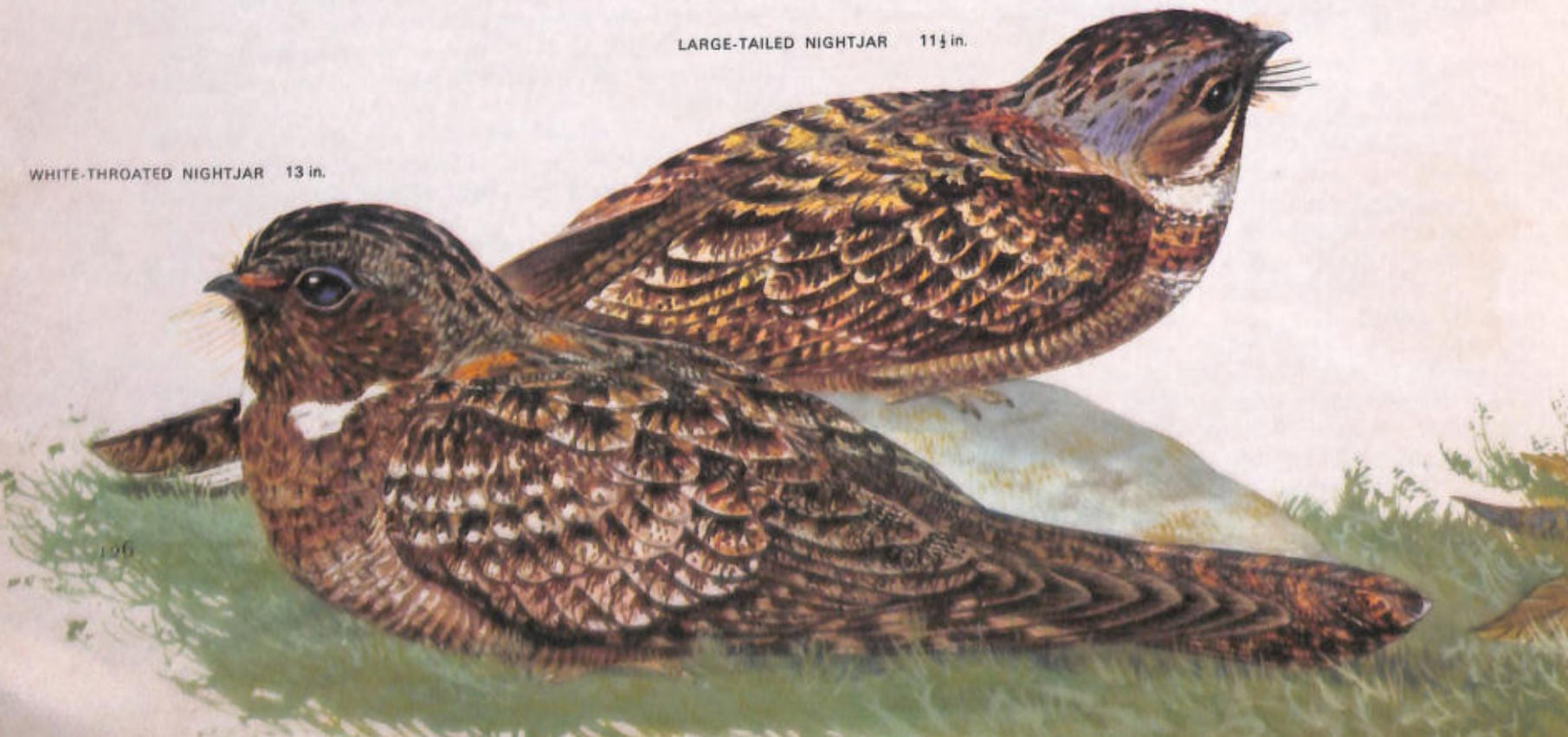
In his deliciously heavy-handed style, Gilbert White has reflected on an aspect of ornithology that is no less amazing and hardly less puzzling, now that we do know that many small birds undertake their extraordinary journeys twice a year.

White had pretty well convinced himself that the swallows and martins he saw, gathering in dozens in the reed-beds before their flight south, actually plunged down into the mud below to spend the winter in a torpid state. As for the swifts around the village belfry, these no doubt were driven by the frosts and chill autumn winds to seek refuge in the cracks and crevices of the ancient masonry.

More recent and more sophisticated opinion has dismissed all these theories completely. However, in 1946 a species of American nightjar was actually found to be hibernating in rock crevices! The Indians of Arizona had known of it for years, but by white men it was dismissed as an Indian folk-tale.

It is a true hibernation that these birds go through: their body temperatures drop from 102°F to about 65°F, breathing almost stops, and their digestive processes cease altogether. Banded birds have been found dormant in the same niches in successive winters. Gilbert White would no doubt have been charmed and delighted to have his theories at least partly vindicated.

The Frogmouths are another group of Caprimulgiform



birds fairly well represented in this country. We have four species, amongst which there is a good deal of colour and size variation—even within each species—often there is a distinct reddish or greyish phase. Judging from skins, it seems that some forms may merge into others where their distribution overlaps.

The family contains twelve species altogether which are found in Malaya and eastwards to the Philippines, the Solomon Islands, and down to Australia. These birds have extraordinarily wide, short bills and a very developed tuft of stiff bristles growing between the eye and the bill.

Instead of hawking after insects on the wing, the frogmouths prey on crawling insects such as beetles, scorpions, and caterpillars. Some species even catch small mice.

The last bird in this interesting group is the Owlet-nightjar. We have but one species in Australia, but the whole family is comprised of eight species, found mostly in New Guinea.

Like the frogmouths, they feed on ground insects, and are not particularly powerful fliers. Unlike the frogmouths which perch upright on branches and stumps and the nightjars which lie along tree limbs, the owlet-nightjars perch across a branch in the more usual bird fashion.

They are not as vociferous as the rest of the order, and lack their loud calls.

## NIGHTJARS

The White-throated Nightjar, *Eurostopodus mystacalis*, is found down eastern Australia from Cairns to Victoria. It tends to be a bird of the coastal districts, seldom occuring west of the Great Dividing Range. This Nightjar is also a New Guinea species. Oddly enough, none of the three Australian nightjars has been recorded in Tasmania. The birds are strong fliers, some species in other parts of the world migrate considerable distances each year between their breeding and their wintering quarters, so the narrows of the Bass Strait should present no physical barriers. On the contrary, the Tawny Frogmouth, which is relatively weak on the wing, is a common bird in Tasmania.

During the day the White-throated Nightjar rests on the ground. Its beautifully marked plumage affords it great protection, breaking up its outline to merge the bird with its background of fallen leaves and other natural debris.

TAWNY FROGMOUTH 18 in.

SPOTTED NIGHTJAR 12 in.

Their dark eyes sometimes give them away, and more than once my attention has been drawn to the bird by this, before I've actually seen the shape of the bird. Perhaps for this reason, as much as for sleep, the nightjar tends to keep its eyes closed during the day.

At dusk, the nightjar takes off to hunt for insects. Hawking for insects through the darkness, the bird catches them up in its extremely wide mouth. On each side of the gaping bill are a few stiff bristle-like hairs, which no doubt help to trap the flying insects. Moths are the nightjar's principal food but a few other nocturnal insects are probably taken.

They have, in common with owls, virtually silent flight. Sweeping overhead, dark and shadow-like, one might easily overlook the bird except that they frequently call whilst on the wing. The White-throated Nightjar has a weird laughing call, which is quite startling if it suddenly breaks out close by.

The habitat is open forest and scrub country. Typically if hunts along ridges between bush filled gullies, although, they were not uncommon ten or twelve years ago on the ti-tree and bottle-brush flats around Port Phillip Bay in Victoria.

No nest is made by this species; the single egg is simply laid upon the gound. It is a very difficult 'nest' to find as the patterned egg is almost impossible to see, even when one knows that it is there. The egg is buff-coloured, creamy, or stone-grey with bluish-grey scribbled markings overlaid with black. The breeding season is from October to December.

The Spotted Nightjar, *E. guttatus*, is a bird of the inland parts of the continent generally, and Cape York Peninsula. The Great Dividing Range separates this bird from the White-throated Nightjar throughout most of its range. The Aru Islands and New Ireland also have their populations of the Spotted Nightjar.

By day they are usually seen singly—if they are seen at all—nesting amongst fallen leaves, sticks and other debris. They are extremely well camouflaged and one can walk within inches of the bird without seeing it. If in imminent danger of being trodden upon, the nightjar springs up on silent wings. It presents a beautiful sight, as the chestnut, grey and mottled umbers of the plumage are displayed for a moment at close range before the bird takes off.

At dusk they commence their hunting and sometimes a number may be seen at once, dashing back and forth against the darkening sky in pursuit of moths, beetles and other flying insects.

The call is most odd; a number of cawing sounds followed by a gobbling, bubbling cry which diminishes in volume.

No nest is built; the single cryptically marked egg is laid upon the ground. The egg is yellowish-olive to pale-green and is marked with spots of reddish-purple or black. The breeding season is from September to December.

In the more northern parts of Australia, the Large-tailed Nightjar, *Caprimulgus macrurus*, is found. The range of this bird is from the Northern Territory to coastal central Queensland. Placed in a different genus from our other nightjars it is considered to be related to the *Caprimulgus* nightjars of the European area.

It is a relatively long-tailed species although the smallest bird of the family in Australia. This bird's range extends all the way to India, through New Guinea and the Philippines.

Country names for this bird, such as 'Axe-bird' and 'Hammer bird', are derived from its peculiar note which resembles the 'chock-chock' of an axe striking timber.

Like the other nightjars, it rests during the day, hiding in its broken patterned plumage against a background of grasses and fallen leaves. At night they hawk through the warm air with a bouyant erratic flight. Although twisting and turning a good deal in pursuit of insects, these and the other nightjars, have a deliberation, almost a slowness, in their wingbeats, and now and then they will glide for a short distance.

The Large-tailed Nightjar inhabits open forest and bush-country near the coast and along streams. Contrary to the two other nightjars in this country, this bird lays two eggs; a habit it shares with the European representative of the family.

No nest is made, the eggs being laid straight on the ground. They are pinkish or reddish-cream with cloudy markings of grey and purplish-brown; the breeding season is from September to October. Nightjars are unusual in the bird-world in that, if sufficiently disturbed, they will move their eggs. This is not uncommonly recorded in other countries and observations would perhaps prove it to be so in Australia. The American naturalist-bird painter, Audubon, first recorded this, and for a long time it was doubted, but the habit has been observed frequently since.

OWLET NIGHTJAR 8½ in.

## FROGMOUTHS

The Frogmouths are a very strange-looking group of birds with sad, wild eyes and beautifully mottled plumage. Of the four species in this country, the most common is the Tawny Frogmouth, *Podargus Strigoides*. It is found throughout most of Australia where suitable habitats permit. It is also common in Tasmania. This bird is frequently called the 'mopoke' but in fact its call is nothing like this. It is the boobook owl's call which resembles 'mopoke' or 'boo-

book'. The cry of the Tawny Frogmouth is an oft-repeated 'oom' which carries a great distance. An odd characteristic of this call is that although it may be heard from perhaps half a mile away, it sounds relatively soft from close by, even from a bird perched almost over one's head. When disturbed in daylight, the Tawny Frogmouth has been heard to make a buzzing sound, rather like bees.

There is great variation in the plumage of the Tawny Frogmouth, but if one accepts a lion as being tawny or the dictionary definition of the word, at no time are they tawny! The most common colour is basicly a mottled grey, with some birds being a light pearly colour and other specimens grading to a dark slaty-grey. These are not differences dependent on locality, because both dark and light birds have been collected from the same areas. The size is also very inconsistent, some of these frogmouths being as much as half the size of others. Apart from the various grey birds, a reddish phase of this frogmouth is sometimes reported.

These birds feed on insects but unlike those other Caprimulgiform birds the nightjars, they do not hawk for them in the air. The prey of frogmouths is the crawling wriggling host found on the floor of the open forest: beetles, larvae, crickets and other insects. They also will eat mice and other small mammals. Frogmouths are quite frequently found dead on the country roads, where they have come to catch insects and been hit by a passing vehicle.

During the day the Tawny Frogmouth is difficult to find as it spends its time perched upright on a stump or amongst the larger branches of a tree. Its cryptic plumage and unbirdlike silhouette bear a remarkable resemblance to a mossy broken branch-stump. At dusk and dawn the bird may be seen sitting athwart a branch or fence post much like any other bird, but in broad daylight they invariably assume their 'stump-pose'. The nest is a loose, but sometimes dense platform, of sticks placed in a tree. It has a saucer-shaped depression which is usually lined with green leaves. If surprised at its nest the frog mouth displays at the intruder, fluffing out its feathers to make itself appear much larger, and snapping menacingly with its heavy bill.

Two or three white eggs are laid and the breeding season is from August to December.

The Papuan Frogmouth, *P. papuensis*, inhabits the Aru Islands and New Guinea with its range extending down to Australia, from Cape York to Cairns.

In general this is a browner bird than the Tawny Frogmouth, but is spotted and marbled in similar patterns: the female is smaller and is said to be more reddish than the male.

This bird is a frequenter of the open forest and scrub country. During the day it sits in an upright pose on a stump or branch and resembles a continuation of the wood and bark as closely as do its relatives. It is also reported to perch on the ground in a similar pose.

At night these birds hunt insects and various small mammals on the ground. Like all frogmouths, this bird sits on a low branch or stump, and as some small creature passes within range it flops silently down to capture it.

The Papuan Frogmouth has a weird laughing call and a very frog-like croak. It also has a deep 'oom-oom' call similar to that of the tawny bird, and it persists in calling for long periods. A platform of twigs is built for a nest and this is generally in the forks of branches quite high up in a tree. The breeding season is from September to December and sometimes as late as February.

The Marbled Frogmouth, *P. ocellatus*, is found on the Cape York Peninsula and in New Guinea. This bird is similar in its habits to the other frogmouths: hiding during

the day in the thick scrub or sitting upright, camouflaged as a stump. During the night it hunts for insects, 'chiefly beetles', obtaining its food on the ground and not by the pursuit of flying insects.

The nest is a platform of twigs on a branch of a tree usually in thick scrub. October is the only month recorded for the breeding of these birds and there are the usual two white eggs.

Plumed Frogmouths, *P. plumifera*, are found from south-eastern Queensland to north-eastern N.S.W. They are rare birds and very little has been recorded of their habits. No doubt they behave similarly to the other *Podargi*, concealing themselves during daylight, and hunting ground insects at night.

Museum skins show this to be a very red bird, almost a deep henna colour, marked on the back with black and dark-brown. The nest is a platform of sticks placed in the forked branches of a tree; nests recorded have not been very high, only about twenty feet from the ground. Two or three glossy-white eggs are laid and the breeding season appears to be from September to December.

### OWLET-NIGHTJARS

The Owlet-nightjar, *Aegotheles cristata*, inhabits most parts of Australia where suitable wooded habitats permit. It is also common in Tasmania.

These elfin little birds, with their large heads and attenuated bodies appear to be distantly related to the frogmouths. During the day they hide away in hollow trees and stumps but are often curious enough to come and peer out of their roosting-hole if the tree is tapped.

At dusk they emerge to hunt for insects. Their feeding habits are a mixture of those of both the nightjars and the frogmouths. Flying moths and beetles are caught on the wing, although much of the hunting is done from the ground—the bird rising to intercept a passing insect. That much of the owlet-nightjar's food is obtained on the ground is shown by the non-flying insects in the stomachs of collected specimens.

On heavily overcast days, they will emerge from their hiding-spots well before dusk, to hunt in the dull light. They are also vociferous during the day, calling their double 'chirk-chirk' note from their roosting hollows. Sharland also notes another call '. . . like the noise of water being poured from a bottle'.

The nest is a hole in a tree or stump. At the bottom of this hole the eggs are sometimes laid on the wood-dust but more frequently a nest of leaves is made. These are, sometimes at least, renewed as they wither. Three or four white eggs are laid; these occasionally are lightly spotted. The breeding season is from September to December.

There is a good deal of colour variation within this species. Without indicating any clear-cut geographical races these variations might be set out as below.

1. South-west and mid-west Australia, South Australia, N.S.W., Victoria, south Queensland (and perhaps north Queensland)—greyish to blackish on the upper parts, with lighter freckling: heavily freckled greyish-brown below.
2. Northern Territory and the Kimberley area—sandy-brown colour above, freckled lighter: freckling below confined to upper breast, remainder of underparts white. This bird often has a slight rufous tinge.
3. This variety is not considered a race by all students but rather, a phase. South of the Hamersley Range and around the Ashburton River birds occur that are particularly rufous in colour: barred darker-brown and freckled with grey. These would be hard to differentiate from the most rufous phases of the other Owlet-nightjars.



## APODIFORMES

Swifts

In Australia we have three common species of swifts and two rare visitors. The latter are the Glossy Swiftlet and the Uniform Swiftlet, and as vagrants they are treated at the back of the book.

Related to these two birds is the more common Grey Swiftlet. The swiftlets are a large group, distributed widely throughout the Indo-Australian region and the islands of the western Pacific. It is the nests of some species of swiftlet that are used for the famous birds' nest soup. All of the Apodiformes use saliva to a more or less extent, to glue their nests together and fasten them to the walls of their nesting cave or other site, and in Malaya and Indochina, there are species which make their nests entirely of this protein-rich saliva. These nests are the most sought-after for the Oriental soup-trade.

The larger swifts are extremely fast and powerful fliers, some species being credited with speeds up to 200 m.p.h. Most of their lives are spent on the wing, some birds even staying out all night: whether they are able to 'cat-nap' whilst actually in the air is not known.

Pictures of swifts on high-speed film have shown that they are able to beat their wings at slightly different speeds, thus facilitating the rapid turns characteristic of their flight.

All swifts have very small weak feet and legs, and are never seen perching in trees or on the ground. If brought to earth by some mischance, a swift is only able to take off again if there is some prominence or cliff-edge to which it can struggle; otherwise, the unfortunate bird cannot raise itself high enough off the ground to spread and use its very long wings.

When the birds do land, they cling vertically to a cliff-face or building, hooking their small sharp claws into a crevice or over a ledge. In some species all four toes point forward to make a more efficient hook. Most also have short, stiff tails which support them as they cling.

Most swifts tend to be migratory. As their food consists entirely of insects caught on the wing, the birds must leave their nesting grounds at the end of each summer to visit warmer parts. Like swallows, they often return to exactly the same nesting spots year after year.

In spite of being rather similar in appearance and habits to swallows, they are not related. The two groups of birds are, indeed, a good example of convergent evolution: unrelated species that have developed similar physical appearances because of similar habits. One of the main outward differences between swifts and swallows is that the latter perch and 'sing' and are thus fairly typical passerine birds.

Being delicately boned birds, the fossil records of swifts are scarce. A few fragmentary remains found in France were in Oligocene deposits, showing that the family was clearly differentiated 40 million years ago. The nearest relatives of the swifts—and they are sometimes classified as Apodiformes—are the hummingbirds. It seems likely that millions of years ago they shared common ancestors. The eggs of the two families and the construction of the wing-bones certainly seem to relate the birds more nearly to each other than to any other birds.

### SWIFTS

The Grey Swiftlet, *Collocalia francica*, is the smallest of our swifts and a member of the group which makes edible nests. Their range in Australia is coastal north-eastern Queensland. They are also found in various places north of our continent.

They are quite common within their restricted range and may be seen in flocks of various sizes. They hawk for insects over the coastal ranges and above the forests. These small swifts may also frequently be seen about steep cliffs, either inland or on the coast.

The flight of these birds is not so powerful and direct as that of the larger swifts. They flit about much lower down and pursue a more erratic course in their hunt for insects, rather similar to the hunting flight of swallows and martins.

Nesting takes place in colonies which are sometimes quite large; over two hundred nests have been recorded together. These swifts breed on off-shore islands such as Dunk and Bedarra Islands and also in the mainland hills.

Like other swifts, this bird never lands voluntarily on the ground. The nest is made of feathers, light pieces of grass, and other material light enough to be blown into the air. These materials are glued together with the bird's saliva, which is also used to fasten the nest to the rocky wall of the cave where the birds nest. No doubt the gelatin saliva in the nests of these birds would be as edible and tasty as that of the swifts of Malaya, which is gathered to make soup.

This swift has a high-pitched 'cheep-cheep' or 'wheet-wheet' cry and it also makes a clicking sound. One white oval egg is laid and the breeding season is from October to March.

The Fork-tailed Swift, *Apus pacificus*, is a much larger bird and a more typical swift in flight. They are usually seen high in the air and sometimes will mount up out of sight in circles and dashing zig-zags.

The forked-tail is not particularly apparent, quite often appearing pointed in comparison to the squarish tail of the spine-tailed swift. But as the birds wheel and bank, the tail is spread sometimes, in which case its forked shape becomes obvious.

They are migratory birds and their numbers appear to fluctuate from year to year in various districts. They breed in Asia and arrive here in our spring, departing again towards the end of summer. Their appearance is often associated with stormy and humid weather. It may be that the swifts are present in clear dry weather but are flying unnoticed at considerable altitudes. On stormy days they fly low, presumably because the high-flying insects are forced lower in such conditions. All their food is obtained on the wing and the birds never perch in trees nor land upon the ground.

During migration they usually travel in flocks, sometimes mixed with numbers of Spine-tailed Swifts. They are normally in flocks at other times of the year also, although pairs and even solitary birds may be seen occasionally.

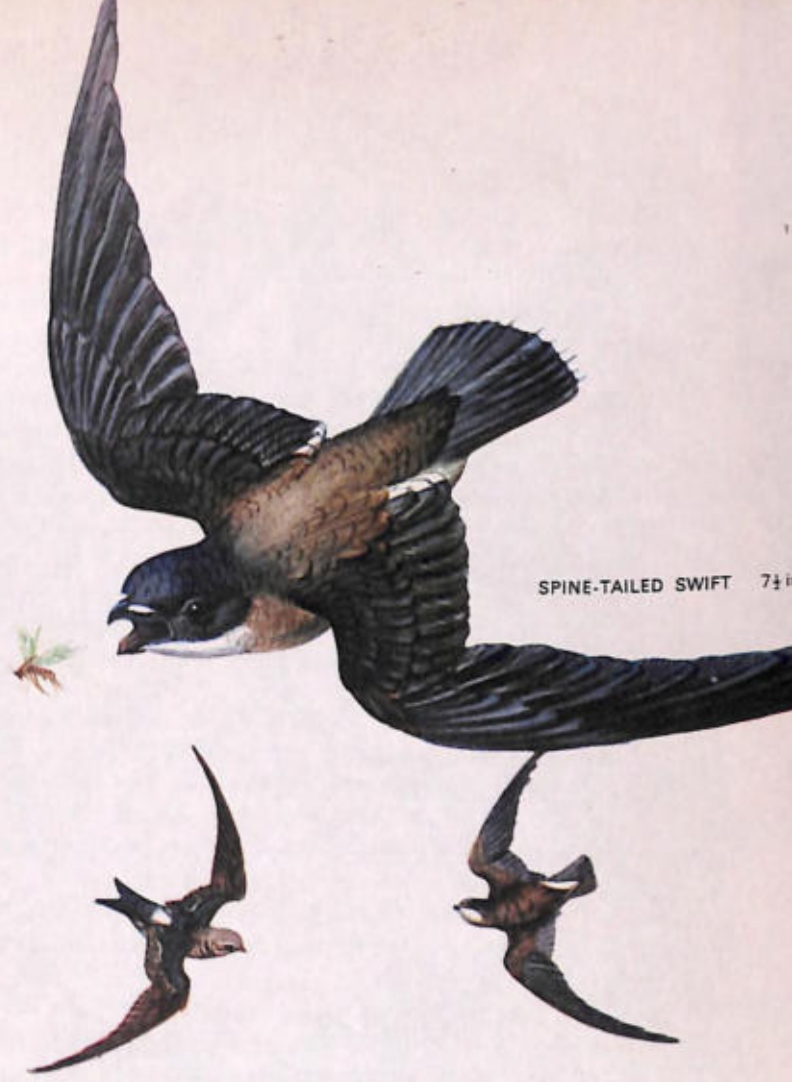
The nest is placed against the rocky wall of a cave or cliff over-hang, glued into place with the birds' saliva. They do not nest in Australia.

The Spine-tailed Swift, *Hirundapus caudacutus*, is a slightly larger bird than the foregoing species and a very fast flier. They are found throughout most of Australia and in Tasmania, and are, in fact, the more common species in the Eastern States.

In Western Australia the fork-tailed is the common swift, there being very few acceptable records of the spine-tailed bird in that State.

These swifts breed in eastern Asia and migrate to our continent to escape the northern winter. They arrive in the late spring and, towards the end of summer are beginning to drift northwards once more.

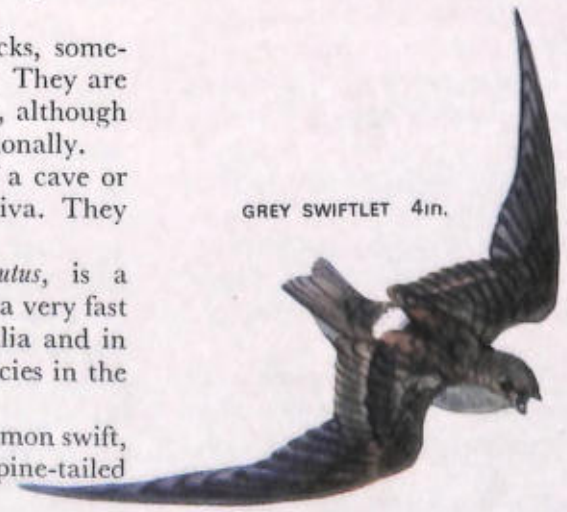
Except in humid, thundery weather they fly high—often out of sight of the naked eye—in pursuit of insects. They




are not uncommon throughout their Australian range, but vary in numbers from year to year in a given locality.

Like other swifts, they never intentionally land on the ground, nor can they perch in trees. They cling with their diminutive feet in an upright position to a rock-face or the bark of a tree: they are also recorded as roosting in thick foliage.

The nests of these birds are similar to those of other typical swifts. They are a conglomeration of wind-blown material, such as feathers and light grass, which the birds catch up in their bills as they fly. This is gummed together in a saucer-shape and stuck to the nest site with the bird's saliva. They nest in colonies, usually in a cave or under a rocky over-hang; sometimes large hollow trees are utilised. Two or three dull white eggs are laid in the northern spring: the bird does not breed in this country.



# CORACIIFORMES

Kingfishers and Allied Birds

The early Greeks believed that kingfishers nested out on the open sea, thus they called them *Halkyons* (*hals*, sea and *kyon*, conceiving). Being favoured by the gods, the sea was calmed for them for the two weeks or so preceding the winter solstice, allowing the little birds a peaceful nesting period. *Halkyon* became *Halcyon* in Latin, and periods of quiet and calm have been called 'halcyon days' ever since.

Actually, by no stretch of the imagination could any of the kingfishers be called sea-birds, although some species are associated with mangrove swamps and other habitats of the littoral.

There are eighty-four species in the world, which are broadly divided into two sub-families: the *Alcedinidae*, or fishing kingfishers, and the *Daceloninae*. The latter are known as forest kingfishers and are often found far from water, where they prey on insects, small reptiles and small mammals, rather than fish.

We have representatives of both sub-families in Australia with ten species covering a great range of size, colour and habits.

The largest of our kingfishers and one of the best known Australian birds is the Laughing Kookaburra. Early settlers and visitors to our shores, their ears attuned to the melodies of thrush and nightingale, were appalled by the wild laughing cry of this giant kingfisher. But the 'jackass' or 'jack' as it is familiarly called, has become a general favourite and is often tamed to the point where the birds will come pecking at the window for their daily handout.

A closely related bird is the Blue-winged Kookaburra of the northern parts of Australia. It is a slightly smaller and more untidy version of the southern bird. Their heads and bills are even larger in proportion than the Laughing Kookaburra and they appear quite mis-shapen and tatty as they fly heavily from tree to tree. Their call is a harsh, strangled imitation of the kookaburra laugh.

At the opposite end of the scale are the Little and Azure Kingfishers. These handsome little birds are fishing kingfishers and may be seen as a streak of colour as they dash over the brown water of the inland rivers and lakes.

Of all our other kingfishers perhaps the most striking are the White-tailed Kingfishers. These are birds of the tropics and summer visitors. The two long white central tail feathers may be up to twice the length of the bird's body and are very striking as the bird flies against a background of lush dark foliage.

Included in the Coraciiformes are two birds that might not at first sight appear to be related to the group. These are the Bee-eater and the Roller or Dollar-bird. One feature which they have in common with kingfishers is their syndactyl feet: that is to say the three front toes are joined for part of their length.

The Bee-eater is a brilliantly-coloured bird and indeed is often called the 'rainbow-bird'. It is a slim graceful creature with a long, curved bill and two very elongated central tail feathers.

It eats bees and other insects which it catches in flight. They have the habit of sitting on an exposed dead branch or fence post and launching themselves at passing prey. Their flight is swift and soaring and a number of them busily flying back and forth in the sunshine is a very beautiful sight.

The Roller is a much more heavily built bird, not unlike a kingfisher except for the short wide bill. They are also insect eaters, and spend much of their time perched in some high exposed spot waiting for some luckless butterfly or locust to fly past. They also feed on the ground on such small fry as grasshoppers and ants.

The birds are so-named because of the aerobatics they indulge in when displaying before mating. They do complete rolls in the air and even somersaults. Dollar-bird is an alternative name for these interesting birds, which derives from the large round white spot on each wing which shows clearly in flight.

## KINGFISHERS

The Little Kingfisher, *Alcyone pusilla*, is the smallest of the Australian kingfishers. This and its relative the Azure Kingfisher are the only 'typical' fishing kingfishers in this country, the remainder being largely birds of the mangroves and forest.

Little Kingfishers are found along the coastal districts of the Northern Territory and in northern Queensland as far south as the Townsville area. Their range extends north of Australia to New Guinea and the Molucca and Solomon Islands.

They are seen singly or in breeding pairs and, frequent the banks of rivers and small creeks. These birds are swift fliers and very alert; one usually sees only the brilliant blue back of the bird as it streaks away across the water on being disturbed. Fishing is done from a stick projecting from the river or a bare overhanging branch. The kingfisher gazes down until, spying a fish, it dives, going under-water in pursuit of its prey. Returning to its perch with the fish, the bird swallows it—often with a struggle—and sits for a while relaxing with feathers fluffed out, whilst the meal settles.

The nest is at the end of a tunnel excavated in the bank of a stream. Sometimes the hollow of a stump near the water is utilised. No actual nest is constructed, the eggs being laid in a rounded chamber at the tunnel's end.

After the young have hatched out, this nest-chamber soon becomes an unsavoury hollow, well carpeted with regurgitated fish bones, scales, and the excreta of the nestlings. No attempt is made by the parent birds to clean the nest.

The call note of these kingfishers is a high piping cry usually uttered on the wing.

Five round eggs are laid and these are a pure gleaming white. The breeding season is from November to February.

Azure Kingfishers, *A. azurea*, are more widely distributed than the foregoing species. Their range is from the Kimberley area in the northwest, east and south to south-eastern Australia and Tasmania, in which State it is considered to be uncommon, being confined mainly to the north and west of Tasmania. North of Australia the range of this bird extends to New Guinea and the Molucca Islands.

Either singly or in pairs these kingfishers may be seen along fresh water or brackish streams. Typically kingfisher in their hunting, they perch on a dead branch over the water, awaiting their prey, frequently bobbing their heads as they sit. As well as small fish, these kingfishers take yabbies, small frogs, water-beetles and crabs. Crustaceans are dashed against the birds' perch to dismember them before being swallowed. Dives into the water may be made from a few inches, or up to thirty feet or so. When disturbed from their perch, the birds fly off with a shrill cry. They dash off over the water, and prefer to follow the twists and curves of the river rather than cut across the land.

A nesting tunnel about two feet long is dug into the

river-bank. At the end of this is a rounded chamber six inches or so in diameter. A clutch is usually five or six and the eggs are rounded and glossy white. A nesting-hole appears to be used by the same pair of birds in consecutive years and two broods are often raised each season.

No nesting material is used, but the young birds soon foul the nest with regurgitated fish debris and their own excreta. No nest-cleaning is carried out by the adult birds.

The breeding season is from July or August until January in most parts, but in the north can be as late as April.

In the genus *Halcyon* we have four kingfishers that tend to inhabit dry scrub and woodland areas as much as creeks and rivers.

The Mangrove Kingfisher, *Halcyon chloris*, is probably the most aquatic of our *Halcyon* birds. Mangroves are the main haunt of these kingfishers and their range in Australia is coastal, from Carnarvon in the west to northern N.S.W. Outside Australia these kingfishers are widely distributed, being found from the Red Sea to Fiji.

They spend much of their time perched on a bare bough or dead stick overhanging the water. Gazing down, the bird awaits its prey and then swoops down to the mangrove mud or dives into the water. In my experience they are fairly tame and allow a close approach if one is cautious.

The call-note of this bird is a high dry-sounding 'chik-chik' and also a cry that is reminiscent of the kookaburra's laugh.

Small fish and the crabs that sit outside their tunnels in the mud are taken for food. As a passing shadow or the least vibration of the ground sends these little crabs backwards into their holes quicker than the eye can follow, it is not surprising that the kingfisher is not always successful in catching them. I have watched a Mangrove Kingfisher make half a dozen sallies from its perch before returning with a crab, which is dashed against the branch a few times before being swallowed.

The nest is a hole in a tree or in a termite's nest. Three or four white eggs are laid and the breeding season is from October to December.

The Sacred Kingfisher, *H. sanctus*, is a fairly common bird that may be seen in all states including Tasmania. Basically, the bird is an insect eater and may frequently be found far from water. Occasionally, however, a pair of birds may take up residence on or near a creek and will fish as well as capture insects, small reptiles and frogs.

This is a migrant kingfisher reaching the southern limits of its travels in August and September and departing northwards again in March. A few birds have been recorded as remaining all the year. Outside Australia the range of this bird extends to New Zealand and in the north to New Guinea and many other south-east Asian islands.

The note is a loud clear 'kee-kee-kee', which may sometimes be heard at night, especially if the bird is disturbed. They are pugnacious kingfishers, and will defend their nest with harsh grating cries and fluttering attacks upon the intruder.

They hunt in the usual kingfisher manner except that they seldom fish. A number of favourite perches will be used, from which the bird darts out to capture a passing insect or dives down to pick up some small animal from the ground.

The nest may be found in a variety of sites. In Western Australia the bird commonly uses a hollow branch 'spout' or any other suitable hole in a tree. In the east, a river bank, tree-stump or termite's nest is frequently used. The birds excavate a tunnel into the hard soil of a termite's nest by pecking and drilling with their sharp bills. The nest cavity is hollowed out inside and the termites seal off the passages encroached upon by the kingfisher's digging. Four to six spherical white eggs are laid and the breeding season is from October to January.

The Forest Kingfisher, *H. macleayi*, is found from north-western Australia across the top of the continent and down the eastern states as far south as the Port Stephens district in N.S.W.

In the northern parts of its range this kingfisher is a year-round resident, but the southern population moves north in March and returns again in about September.

Its habits and habitats are similar to those of the Sacred Kingfisher and, like that bird, it favours dry country as much as, or more than, water-courses.

They have a loud 'kingfisher' call, a rather harsh 'tsee' uttered many times throughout the day. Their food is insects, crustaceans, small fish and lizards.

The nest hollow is excavated in a termite's nest or a tree, often at a considerable height from the ground. Four to six white eggs are laid and the breeding season is from October to December.

Red-backed Kingfishers, *H. pyrrhopygius*, are probably the least aquatic of the small kingfishers (as opposed to the kookaburras) and are usually found in dry areas, often miles from any water.

The range of these kingfishers is the interior generally, although they sometimes visit coastal districts and have been recorded as far south-east as Melbourne.

They feed upon insects and small reptiles, pouncing down upon them from an exposed branch in the typical kingfisher manner.

The voice of this species suits its environment rather well. The call is a single monotonous mournful whistle, oft-repeated, that one soon associates with the arid, often dull country in which the bird frequently lives.

The nest is a tunnel dug into a termite's nest, or the steep bank of a dry creek. Four or five spherical white eggs are laid and the breeding season is from September to December.

LITTLE KINGFISHER 4½ in.

RED-BACKED KINGFISHER 8 in.

DOLLAR-BIRD 12 in.

The Laughing Kookaburra, *Dacelo gigas*, is the largest kingfisher in the world and one of the best known of Australian birds. The name kookaburra is aboriginal and has been selected from a large number of similarly onomatopoeic names such as: kowburra, akkaburra, arkooburra, googooburra, gurgaga, gingarga and a host of others.

The Kookaburra's range is from inland Cape York and down through eastern Australia and southern Australia to the Eyre Peninsula and Kangaroo Island. It was introduced into Western Australia in 1898 and is now firmly established in the south-west corner. In 1905 it was introduced into Tasmania where it is thriving in the north but only slowly extending southwards. Because of its depredations amongst small birds it is not protected in Tasmania.

The wild laughing cry of this bird was not looked upon kindly by the early settlers and explorers who, almost unanimously, described it as unpleasant in one way or another. Typically, it was described as 'Apalling as the ravings of a madman . . . It strikes upon the ear with a wild clash . . . and ends in a prolonged sardonic chuckle.' They

DOLLAR-BIRD

BEE-EATER 10in.

are most vociferous at dawn and sunset and are often the first birds to be heard just before first light.

In pairs, singly, or sometimes in small groups, they favour open forest country. Kookaburras are common birds and have taken readily to man-made parks and gardens, often becoming tame and accepting offers of food. In the bush they are catholic in their diet, eating practically any kind of animal food. Large insects are taken, fish, crabs and other crustaceans, small reptiles and birds. Their prowess as snake killers is well known, if somewhat exaggerated at times. Snakes up to thirty inches or so will be attacked, sometimes by a number of birds in co-operation.

Kookaburras are inveterate nest-raiders; they take many nestlings and are persecuted in return by small birds. Such species as wagtails and honeyeaters are very pugnacious towards kookaburras. I have watched bell-miners pestering one of these kingfishers for an hour at a time. Flying at the larger bird, the honeyeaters continually buffet their target, striking with wings, beaks and feet until tiring of the activity. The kookaburra usually sits through it all, apparently unconcerned, or flies off a few yards, only to be set upon by other birds upon whose territory it has encroached.

The nest of a Kookaburra is usually in a hollow fairly high in a large tree. Sometimes a chamber is hollowed out of a termite's nest in a tree or, more rarely, a tunnel is bored into a bank of earth.

From two to four eggs are laid, these are roundish and pure white. The breeding season is from September to December.

The Blue-winged Kookaburra, *D. leachi*, might be considered a rather poor imitation of the former bird. It is confined to the northern parts of the continent, from Shark Bay in Western Australia to south-eastern Queensland; this species is also found in New Guinea.

One of its calls is a strangled gurgling sound just slightly reminiscent of the 'kookaburra-laugh'; it also has a variety of discordant screams and cackles. Its habits and food are similar to those of the southern bird, and like this bird, it is often the first to start up the dawn-chorus and the last voice to be heard at dusk. During the day they are much quieter unless disturbed.

They nest in a hole in a tree and this nesting cavity soon becomes putrid with fish debris, rotting pieces of meat and the excreta of the young birds. One aboriginal name for these birds—'pookar'—is said to mean 'stinking'.

Three or four white round eggs are laid and the breeding season is from September to November.

The Yellow-billed Kingfisher, *Syma torotoro*, is a northern kingfisher, found in north-eastern Queensland from Cape York to Cairns. Outside Australia the species is found in New Guinea and the Aru Islands.

In New Guinea this kingfisher is mainly a bird of the mangrove swamps but the Australian birds are usually to be seen in dry scrub and open forest country.

Not a great deal of data is available about this bird but its habits appear to be similar to those of the other forest kingfishers. The call is a mournful ascending trill.

These birds nest in a hole in an arboreal termites' nest. Four white eggs are laid and the breeding season is from November to January.

The White-tailed Kingfisher, *Tanysiptera sylvia*, is another bird confined to the north, its Australian range being from Cape York to Cardwell in Queensland.

These kingfishers are summer migrants, coming down from New Guinea in November to breed and returning north in February and March. Some birds have been recorded as late as May.

There is a variety of calls heard from this dry-land kingfisher: a 'chop-chop' sound, a shrill screaming note and a persistent trilling. They feed on insects and reptiles and nest in a termite mound, the tunnel usually being close to the ground. Three or four round white eggs are laid at the end of the nest burrow and the breeding season is from November to January.

## BEE-EATERS

Also included in the Coraciiformes are two Australian birds that are not kingfishers. The first of these, the Bee-eater, *Merops ornatus*, just as commonly called the Rainbow-bird, is found throughout most parts of Australia where habitats permit. They migrate southwards from the islands to the north of Australia and the northern parts of this continent. The birds reach the southern limits of their range about September and October and move northwards again in February and March.

Bee-eaters frequent open park-like country and cultivated areas. They have a great fondness for bees and many are shot by apiarists. However, they also do a great deal of good by taking 'harmful' insects including blow-flies, also dragon and robber-flies, both of which are predators of bees.

Bee-eaters have a high churring call note, often uttered on the wing as they dart and glide gracefully in pursuit of insects. They spend a good part of their time perched on fence-posts or exposed branches, from which they sally forth after their prey.

The nest is a tunnel excavated by the birds in the flat ground or in a bank. Often three feet long or so, this requires considerable effort by the two birds. They burrow by digging the soil loose with their bills; and then, resting on their 'shoulders' they shoot the earth back with their feet, sending showers out of the entrance hole.

At the end of the nest tunnel a hollow is made in which the five to seven glossy white eggs are laid. This nest hollow and the entrance tunnel become littered with the remains of insects fed to the nestlings.

The breeding season is from October to February.

## DOLLAR-BIRDS

The Roller, *Eurystomus orientalis*, or Dollar-bird as it is equally well known in this country, is fairly common in northern and eastern Australia. In South Australia and Tasmania it is considered to be a wanderer or accidental visitor, reports of it being very rare.

They breed in Australia and are migrants and birds of passage northwards through New Guinea to the Moluccas, Celebes and the Bismark Archipelago. Rollers also reach Lord Howe Island and New Zealand.

At the end of September and during October they spread to the southern limits of their range in Australia, departing again in February and March.

Like other species in this order, they spend much of their time perched on a bare branch, usually a high one, from which they make wheeling flights in pursuit of passing insects. Rollers are active at dusk and appear to be able to see well enough to hunt in the half-dark.

At sunset and dusk the bird is particularly vociferous, giving out its very harsh 'kak-kak-kak', usually when in flight.

Nesting takes place in a hole high in a tree. Three to five white round eggs are laid and the breeding season is from October to December.

The name Dollar-bird derives from the conspicuous white spot on each wing. Roller is a name which refers to the bird's remarkable display flights, during which it rolls over as it flies and even somersaults in mid-air.

# PASSERIFORMES

## Perching Birds

NOISY
SCRUB-BIRD
9½ in.

RUFOUS SCRUB-BIRD
6½ in.

ZOOLOGICAL GARDEN
623(Z)
CALCUTTA
ALIPORE

# PASSERIFORMES

## Perching Birds

The remainder of the birds in this book are in the one order, the Passeriformes. This is by far the largest and most complex order of birds in the world and contains over half the living species.

Although an extremely diverse order, containing such widely differing species as the Birds of Paradise and the honeyeaters, there are a number of characteristics which inalienably link them all together.

The primary common feature is the perching foot, from which the group derives the name passeriform or passerine. Passerines have four toes, three pointing forward and one directed backwards, none being webbed. It is a foot admirably suited and developed for perching—able to curl around a branch and grip tightly. The tendons of the leg are so arranged that as the bird relaxes—squatting lower—the toes are pulled into a tighter grip. So even while sleeping, a passerine bird is safe upon its perch.

All species in the order hatch naked, or nearly so, helpless, and with their eyes closed. They are reared in the nest and do not leave it until the feathering is well developed; on leaving the nest they are fed for some time by their parents. In contrast to this, consider the young mallee-fowl which hatches on its own and never sees its parents except by accident, or a typical wader such as a plover, whose young hatch covered in woolly down and are able to leave the nest with their parents almost as soon as they are dry.

Passeriformes are found on all the major land masses and most islands throughout the world, being absent only from Antarctica. Their origins in terms of evolution are something of a mystery as are their relationships to other land birds. They appear to have originated during Tertiary times or even before, from a number of parent stocks. Skeletal remains of such small birds are scarce, and the few fossils discovered have helped relatively little to unravel the perplexities of antecedents and relationships between the families.

The order has developed and multiplied into many successful forms since its origins. This development is still in progress and lines of demarcation between families are, in many cases, vague. Thus, there is a good deal of disagreement amongst ornithologists and taxonomists throughout the world on classification within the passerines.

The sub-ordinal arrangements seem to be universally agreed upon. In the nineteenth century the German anatomist Muller showed that the order could be divided into four sub-orders, on the basis of the differences in the birds' syrinxes, or voice-boxes. The first three sub-orders are known as the sub-oscines, and they have four pairs, or less, of muscles in the voice-box. We have representatives of two of these sub-orders in Australia in our pittas, Lyrebirds and scrub-birds.

It is interesting that the Lyrebird, powerful singer and wonderful mimic that it is, should have such a simple syrinx, and be classed as a sub-oscine (that is to say, a sub-singer!).

The fourth sub-order are the Passeres—the true oscines or singing birds—and these have from five to eight pairs of muscles in the voice-box. They number something like half the world's species of birds and the same proportion applies in Australia. Of the seven hundred and seventy-three species and forms treated in this book, three hundred and eighty-nine are perching song-birds, which is over half our birds.

As mentioned above, the exact relationships between these birds and the clear definition of them into families is a vexed question. Various students have divided the passerines of the world into varying numbers of families from thirty-six to fifty-five and upwards.

Any worker having decided on a number of families is still faced with the question of the order in which they will be listed. This is a subject about which there is endless debate and numerous publications, in Australia as much as anywhere.

Contention arises largely from the fact that various systematists consider different characteristics of birds as important, and thus indicative of their place on the evolutionary ladder. To this extent classification is arbitrary.

Broadly speaking, there is a European and an American attitude to the problem. Perhaps it might be said that there is also an Australian attitude developing, falling somewhere between the two, and governed by the ornithology of a relatively isolated island continent.

In Europe the tendency is to put the *Corvidae*—crows and ravens—at the top of the evolutionary ladder because of their undoubted intelligence. Rating almost as high a position, are their relatives the Birds of Paradise and bower-birds, because of their very complex displays and plumage development.

The American ornithologists tend to place the seed-eaters, the *Ploceidae* and the *Fringillidae*, at the top. These are the Old World and New World finches and weaver-birds; these are closely followed by such birds as the tanagers, wood-warblers, and our own pardalotes, silver-eyes and honeyeaters.

The finches certainly show considerable recent development and are considered by many to be the most dominant and most successful of all bird groups. As Oliver Austin says in his *Birds of the World*, 'Many ornithologists . . . feel they represent the main stream of songbird evolution'.

Because the classification of Australian birds is still in a state of flux and formation, this present work follows an American system, as explained at the beginning of the book. It is not the job of a volume such as this one to promulgate new theories, so for this reason and the necessity of having a formed and accepted system, I have adopted a classification that lay to hand.

PRINCE ALBERT LYREBIRD 27 in.
♂
PRINCE ALBERT LYREBIRD
♀
SUPERB LYREBIRD 27 in.
♀

## PITTIDAE
Pittas

These small, plump birds, with their stumpy tails are a closely knit group with all twenty-three species in the world placed in a single genus. We have three species in Australia all of which are birds of the dense forest, brush and coastal jungles.

They are largely terrestrial birds, and when disturbed, scurry off into the densest parts of the undergrowth. If they are put into the air, pittas fly direct and fast, on rapidly beating wings.

Pittas have no 'song' but call with loud double or tripartite whistles. Although these birds spend the daylight hours on the ground, hunting for food, at night they roost in trees, like many ground-frequenting species.

### PITTAS

The Rainbow Pitta, *Pitta iris*, is found in the north of Australia from the Northern Territory westward. It is a bird of the coastal bamboo jungles, mangroves and other dense scrub. Usually to be seen on the ground, this pitta is a fast runner if disturbed in its foraging for snails and insects; it also eats various native fruits.

The nest is a large, rather untidy structure of dead bamboo leaves or other vegetation. Sometimes the nest is built on the ground but more frequently it is in a clump of bamboo or mangrove at a height of six feet or so. It is globular and has a circular entrance-hole in one side.

Four rounded, creamy-white eggs are laid. These are glossy and have sepia patterns over purplish-grey markings. The breeding season is from January to March.

Buff-breasted Pittas, *P. versicolor*, are found down coastal eastern Australia from Cape York to central N.S.W. They are birds of the dense forest and big scrub areas, spending most of their time on the ground where they hunt for snails and insects. A bird will often have a favourite anvil-stone upon which it breaks open snail-shells. Small berries and other native fruits are also included in this bird's diet.

They are inquisitive and can be attracted to within a short distance by a whistled imitation of their loud call, which has been described as 'walk-to-work' or 'want-to-watch'. A single mournful note is also uttered, sometimes during the night.

The nest is a large loosely-built affair of dead twigs and moss; it is domed, with a circular entrance in one side. The nest-site is usually on the ground between the sheltering buttress-roots of a large tree.

An odd habit of the pittas is their construction of a 'doormat' of moist animal-dung on the platform entrance to the nest, which is gradually carried into the nest chamber on the birds' feet.

Three to five creamy-white eggs are laid, spotted with blackish-brown over blue-grey. The breeding season is usually from October to January.

The Blue-breasted Pitta, *P. macklotii*, appears to be a migrant from the north, arriving in north-eastern Queensland about October. Our birds probably come from New Guinea. They are also found through Malaysia and Java.

Like the other pittas, they are frequenters of dense scrub areas. Most of their time is spent upon the ground where they hunt for insects, snails, and native fruits. If disturbed, they run off into the thickets rather than fly.

No doubt they roost in trees as the other pittas do and perhaps also call from a prominence such as a stump or rock. The call is a mournful double whistle.

A bulky, domed nest is built with a circular side-entrance. Twigs and dead vegetation form the bulk of the nest, which is lined with fine rootlets and bark-fibre. It is usually placed on a stump or in a mass of vines just above the ground.

Three or four creamy-white eggs that have purplish and greyish-brown markings are laid. The breeding season is usually from October to January.

## MENURIDAE
Lyrebirds.

Gould wrote, after seeing and studying the lyrebird, 'were I requested to suggest an emblem for Australia from amongst its avifauna, I should, without the slightest hesitation select the lyrebird as the most appropriate'. Since then, of course, the lyrebird's shape has been made familiar by its use on crests and emblems of various kinds throughout the country, although incidentally, the tail is usually represented in a position never assumed by the bird.

Its fine voice is almost equally famous, and justly so, for the bird has a variety of rich notes of its own and is a superb mimic. By the time a lyrebird is a few years old it will have the notes of most of the local birds in its repertoire. Even the unbirdlike kookaburra's chuckle will be heard from time to time. Sounds such as the whine of a circular saw, trucks changing gear, the barking of dogs and other sounds are incorporated into the lyrebird's 'song'. It is interesting that the young birds will learn sounds from their parents, so that the young birds may well be imitating an alien sound which they have heard only from their parents.

There are two species of lyrebirds, although it is surprising how many people, especially in Victoria, are unaware of the fact. The range of both species starts in coastal Queensland but only the Superb Lyrebird's range extends down into Victoria. The other bird, the Prince Albert Lyrebird is found only as far south as the Richmond River area in north-east N.S.W.

RAINBOW PITTA 6 in.

Superb Lyrebirds have a rather more handsome tail, and display to a much greater extent than the northern bird; the Superb also constructs display arenas, whereas the other species does not, indulging in a lesser display in any open spot on the forest floor. In the matter of voice, however, the Prince Albert is almost as accomplished as its relative, having a rich song of its own and being a great mimic.

Both species are unusual in that they nest in the winter. During the summer months the lyrebirds are not particularly vociferous. They spend their days quietly hunting for food amongst the debris on the forest floor. Their feet are very large and the claws are long and curved, making efficient raking instruments. The birds work over large areas of ground, scratching up leaves and twigs and shifting quite large branches with powerful backward thrusts from their legs, and grasping 'hand-like' movements of the feet. Decaying logs are torn to pieces as the birds search for grubs, worms, insects and snails.

As a lyrebird works busily along the ground, it is frequently attended by one or two small birds such as yellow robins, which take advantage of the freshly turned earth and leaves to pick up insects and small grubs for themselves.

During autumn, the male Superb Lyrebirds become more and more animated, and they begin to sing a great deal through the day—where before they tended to sing only early in the morning and at dusk. Part of this autumn activity is the building or renovating of the display mounds. Each male bird might have up to a dozen or so in his territory. These are prepared by clearing out a circular patch in the bracken or other underbrush. By dint of much trampling, biting and scratching, a space from four to six feet across is reduced to bare earth and a mound perhaps nine inches high is scraped up in the centre. Although quite a number of these mounds are prepared within each bird's territory, he will have two or three favourites which are used more frequently than the rest. Some mounds even become time honoured display spots that may be used for a decade or more by different generations of birds.

In the height of the breeding season from May to September, the lyrebird might display a number of times each day.

After scratching at the mound for a moment or two and strutting about upon it, he gives out a strange churring sound—the prelude—and then he bursts into song. The long tail is sometimes thrown forward over the bird's body, becoming a shimmering veil of silver filaments that rapidly vibrate as the rich and varied song comes pouring forth. This must surely be one of the most powerful and melodious bird voices in the world. Not content with his own voice, the lyrebird soon launches into mimicry, mixing into his own song, that of practically every species that would be found in the locality.

Sometimes the female might visit her displaying mate, but not for long. She steps up on to the mound and he comes forward to cover her with his shining tail which now vibrates more rapidly than ever. The song pours out, loud and clear and perhaps they touch bills momentarily, before she turns and springs off into the undergrowth, leaving the male to display alone.

As well as the song and tail-shimmering display, the lyrebird also occasionally 'dances', stepping forwards, sideways, and backwards in a regular movement. With his body swaying rhythmically from side to side the bird emits a 'clonk clonk' sound, now and then jumping from one foot to another. The whole performance—the magnificent tail, beautiful voice, and the ceremonial dance, make up one of the most fascinating sights in the bird-world.

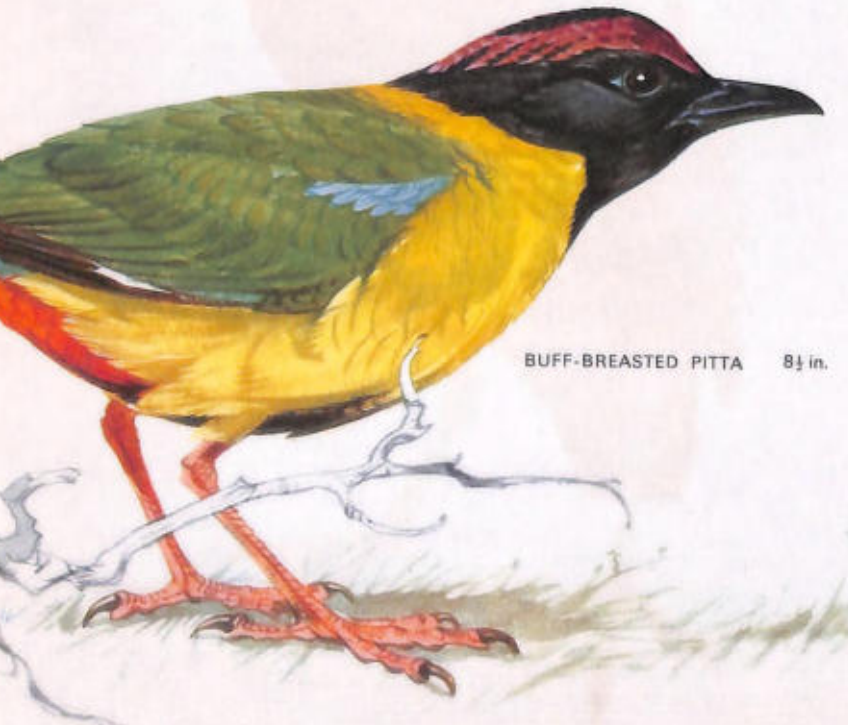
## LYREBIRDS

The Superb Lyrebird, *Menura superba or Menura novaehollandiae*, is found in the hills of coastal eastern Australia, from the Dandenong Ranges near Melbourne to the Stanthorpe area in Queensland. They frequent thickly timbered gullies and hill-slopes and, except for a few birds that come into frequent contact with people in national parks, they are secretive and wary.

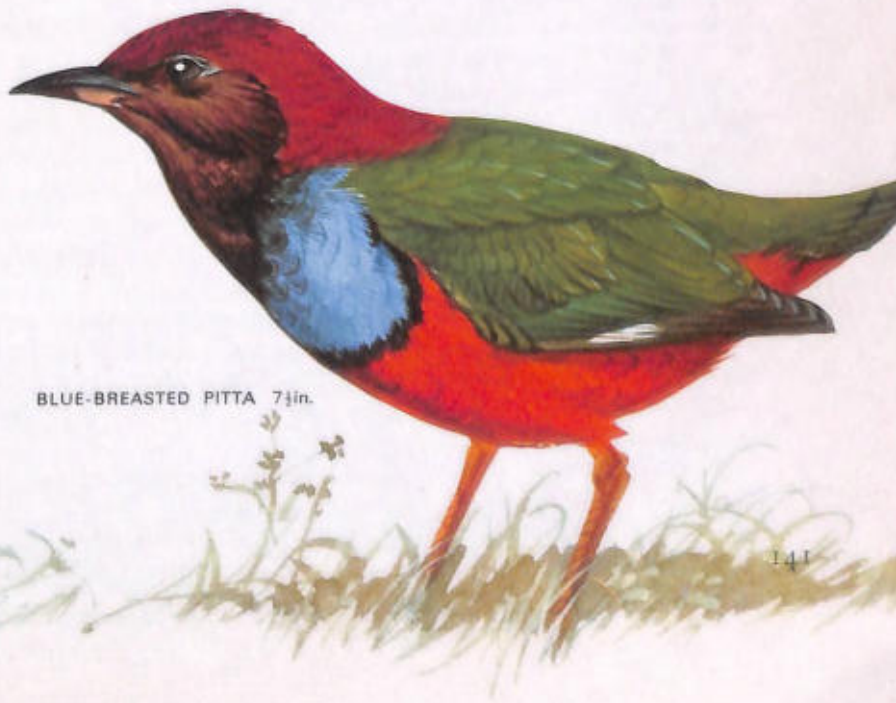
Lyrebirds are, however, inquisitive and I have had them visit camps in the hills more than once. They come to the edge of the clearing, if all is quiet, and stare curiously out of large dark eyes at one's tent, before strutting slowly back into the undergrowth.

As mentioned in the introduction, this lyrebird is a superb mimic, rendering many local sounds as well as the songs of other birds. Its own voice is loud and rich, somewhat reminiscent of a blackbird's song, but with greater volume and tone. One of the bird's main calls is a loud 'choo-choo-choo', heard more often than the bird is seen. The females mimic as well as the males but are less often heard.

Throughout the autumn and winter, the male birds display on low mounds which they scratch up in a specially cleared spot in the undergrowth. On these mounds the male bird sings and displays his beautiful tail; sometimes performing before the female but more often on his own. A number of mounds are made, with a few favourite ones being used frequently. During the display and the dance, the male bird sometimes throws his tail over his back, show-



BUFF-BREASTED PITTA 8½ in.



BLUE-BREASTED PITTA 7½in.

ing off the two lyre-like feathers and the silvery filaments of the rest of the tail.

Whilst the decorative male performs on his mound and vociferously defends his territory, the female undertakes the task of nest building and incubation. When the egg hatches, the rearing of the young bird is again solely the duty of the female.

Although such a terrestrial bird, spending most of its time raking over the debris of the forest floor in search of food, at night it retires to the top of a tall tree to roost.

Apparently not a powerful flier, the bird ascends in short flapping jumps from branch to branch. In the morning the bird flies down to earth in a long impressive glide.

The nest is a bulky structure of twigs, bark and leaves, with an inner nest of rootlets and soft bark. The lining is downy feathers which the female plucks from her own flanks. Nesting-sites vary: sometimes the bird might build amongst the exposed roots of a tree in a steep bank or on top of a stump. A hollow on a rock-slope is not an uncommon site and, where the birds are disturbed by humans and cats and dogs, they tend to build high in trees, some nests being up to eighty feet high. Often, in these high situations the young bird remains in the nest for a fortnight or so longer than the usual six weeks, presumably developing its strength and wing-feathers sufficiently to fly down safely.

The egg varies in ground colour from light stone-grey to deep purplish-brown with streaks and spots of slatey-grey. May to September is the breeding season, with the egg usually being laid in June or July; the incubation period is about six weeks.

Prince Albert Lyrebirds, *M. alberti*, are similar to the foregoing species except that they are slightly smaller, are more rufous in colouring and have a less spectacular tail.

This bird does not construct display mounds in the forest like its relative, but indulges in lesser displays in natural clearings or on a prominent log or stump.

The voice of the Prince Albert Lyrebird is rich and loud and it is also a competent mimic, rendering the calls of many birds and other sounds with which it becomes familiar.

These birds have become rather rare throughout much of their range, due to the clearing of their rain-forest habitats. One of their strongholds is said to be the McPherson Range in Queensland.

The birds' days are spent scratching about on the forest floor, raking over the dead leaves and decaying branches in search of grubs and insects.

They breed in the winter, at which time the males are more active and vociferous than during the remainder of the year. The nest is a bulky mass of branches and bark with an inner layer of roots and shredded bark. The lining is made from rufous, downy feathers which the female plucks from her flanks.

A rock-ledge in the forest is perhaps the most common nesting-site, but the birds also build on stumps or in the exposed buttress-roots of large trees.

The single egg is stone-grey, spotted and streaked darker grey, and breeding takes place in the winter as with the other lyrebird.

## ATRICHORNITHIDAE
### Scrub-birds

There are two scrub-birds in Australia, one is an eastern Australian bird and the other is confined to the south-west corner of the continent. Until recently it was thought that the western species, the Noisy Scrub-bird, was extinct. It was discovered to science in 1842 and, later in the century was seen and collected a few times until in 1899 the bird was seen for the last time for many years.

It had been given up as extinct when, in December 1961 H. O. Webster discovered and tracked down a singing male bird at Two People Bay near Albany in Western Australia.

Scrub-birds are primitive in their anatomy, which has some resemblance to that of the lyrebirds, although they have no close allies. It appears likely that the two species are all that remain of a group which has spread right across the southern portion of Australia when those parts were less arid.

They are largely terrestrial but also spend some time up in the denser parts of the scrub which they inhabit. Scrub-birds are remarkably fast running birds, dashing with great agility amongst the thick underbrush which is their habitat. Scrub-birds rarely fly and if forced to do so, only flutter a few yards before landing again to scuttle off into the undergrowth. The naturalist, John Gilbert, who first collected the bird in 1843, wrote of the western species that, its song was 'sweet and melodious' and also that 'its notes are so exceedingly loud and shrill as to produce a ringing sensation in the ears, precisely the effect produced when a shrill whistle is blown in a small room'. The song is also somewhat ventriloquial, seeming to come first from one side and then another. Both scrub-birds are also able mimics.

#### SCRUB-BIRDS.

The Rufous Scrub-bird, *Atrichornis rufescens*, is restricted to eastern Australia from the McPherson Range in Queensland to the Williams River district of N.S.W. An inhabitant of dense undergrowth and scrub, it is a very wary species, rarely seen but indicating its presence by its extraordinarily loud voice. Indeed, for its size, the bird is said to possess

the loudest song of all Australian species. It has a melodious song of its own and is also a practised mimic. The loud 'chip-chip-chip' call is most penetrating when heard from a short distance. The female utters a sharp 'tick' sound and may also squeal like a mouse when disturbed. These birds spend most of their time upon the ground where they run, mouse-like, and hunt for insects and other small-fry.

A domed, bulky nest is constructed of dead leaves, twigs and other herbage, often including rushes and other aquatic vegetation. The birds line their nest with wet wood-pulp which dries into a smooth cardboard-like shell, making a very curious lining indeed. The nest-site is usually in thick sedges but may also be in dry tangles of underbrush. Because of having to await the drying of the wet wood-pulp, the nest takes about a month to complete.

Two pinkish-white eggs which have reddish and purplish-brown markings are laid. The breeding season is from September to November.

The Noisy Scrub-bird, *A. clamosus*, is confined to the south-west corner of Australia in the region of Albany, so far as is known. For many years thought to be extinct, they were rediscovered in 1961 (see introduction to scrub-birds).

Like the previous bird, this species has a remarkably loud voice and is an accomplished mimic of its neighbours' songs.

These scrub-birds are very rapid runners, and scuttle rodent-like through the undergrowth. If forced to fly they will flutter only a few yards before dropping back to earth.

The nest and eggs are said to be similar to those of the Rufous Scrub-bird. Two eggs are laid about October.

## ALAUDIDAE
### Larks

There are two true larks in Australia, one is a native, the other being introduced from England in the 1850's. It is one of the few introduced species that might be considered harmless except in so far as it may usurp the ecological niches of our native lark and pipit. As far as man's economy goes they do no harm and add a charming song to our grasslands.

*Mirafra woodwardi* and *M. javanica* are now considered to be but forms of the one species collectively known as the Bushlark. These birds have the skylark habit of singing while in soaring flight.

### LARKS

The Bushlark, *Mirafra javanica* is found in suitable habitats from the Carnarvon District in Western Australia through northern and eastern Australia to eastern South Australia.

In open grassy country these birds may be quite common, and are seen in pairs or flocks of various sizes. Large numbers sometimes travel and feed together outside the breeding season.

A singing bird flutters high up into the air, hanging now and then on rapidly beating wings, while it pours out its rich song which is similar to that of the British Skylark.

In the field, it may be confused with the Australian pipit and the introduced skylark, but it has a much heavier, almost finch-like bill. On the ground it runs and walks rapidly, but not as quickly as the pipit, nor does it wag its tail up and down as the pipit does. The diet of the Bushlark is grass-seeds and insects.

It mimics the songs of other birds to some extent and may often be heard on moonlit nights. The nest is usually beneath the shelter of a tussock or boulder and is a domed grass ball with an entrance in one side; three to four or five eggs are laid which are greyish-white, freckled with dark grey and brown. The breeding season is from October to February.

The Skylark, *Alauda arvensis*, is found in southern South Australia, Victoria, Tasmania and southern N.S.W. Early in the 1850's this famed singer was introduced into Victoria from Britain. The Skylark has thrived in this country and may be heard in the spring and summer in most open grassy

habitats. It appears to be less common in N.S.W. than elsewhere.

The song, so extolled by the poets, is similar to that of the Bushlark. The Skylark might, in fact, be easily confused in the field with the Bushlark, but is a rather more heavily built bird.

A few grass blades are formed about a cup-shaped depression in the ground to make a nest; often in the imprint of a hoof. Four or five greyish eggs, spotted, usually quite thickly, with brown and dark grey, are laid. The breeding season is from September to January.

## HIRUNDINIDAE
Swallows and Martins

The Swallow family is very popular with man and perhaps always has been. The frequency with which they live in close proximity to us and use buildings for their nesting-sites, and their return each year at the beginning of the better weather, has given them a secure place in the affections of many peoples and their legends. Contrary to superficial appearances, they are not related to swifts, their similar form being due to a similar way of life.

### SWALLOWS

The Welcome Swallow, *Hirundo neoxena*, is our best known swallow and a general favourite, its vernacular name indicating the pleasure with which its return is noted each spring. They are distributed throughout most of Australia and Tasmania, except for the far north of the continent.

On the whole they are migratory, but on a sunny day in winter a few will sometimes appear where there were none before, so presumably some stay south all the winter.

These swallows have delicate twittering songs and often, a number of them will sing at once, as they sit along a fence or telegraph wire. They feed on flying insects.

The nest is a cup of mud pellets strengthened with odd pieces of grass and straw. The eggs are laid in a deep lining which is usually feathers, but may have a mixture of hair and grass through it. Four or five white eggs is the usual clutch; these are delicately spotted with reddish-brown and lavender. The breeding season is quite long, extending at least from August to December and occasionally into autumn.

The White-backed Swallow, *Cheramoeca leucosterna*, is largely a bird of the interior, extending to the coast in only a few places. Usually in small communities they frequent open country in the vicinity of a creek or river. They are nomadic birds as a rule, their movements no doubt being governed by water conditions and the consequent insect population.

They take shelter during cold windy weather and a number of birds may often be found nesting in the one nesting burrow.

This nest burrow is up to three feet long and is dug into the bank of a creek or in a similar situation. At the end is a nesting chamber lined with leaves and grass. From five to seven white eggs are laid and the breeding season is from August to December.

### MARTINS

The Fairy Martin, *Hylochelidon ariel*, is a common bird throughout most of Australia except the driest parts, but is rare in Tasmania.

In flocks of various sizes, these pretty little birds may be seen in the vicinity of creeks and rivers, where they fly back and forth in pursuit of insects. They often favour a locality where there is a bridge for them to build under. Nomadic on the whole, they will sometimes remain in the locality if the weather remains mild and the insects abundant. The nest is an interesting bottle-shaped structure of mud pellets. Dozens may be built adjoining each other so that the collection of nests appears as a mass of short tunnel entrances to a great irregular globe of mud pellets. The nesting-site may be under some projection on a building, beneath an overhanging river bank or under a bridge.

Four or five eggs which are speckled with yellowish or reddish-brown are laid. The breeding season is from September to January.

Tree Martins, *H. nigricans*, are found throughout most of Australia and Tasmania except in the very dry parts; they also become less common further north except when on migration. Outside Australia, these martins are also found in Timor, New Guinea, the Moluccas and the Aru Islands.

Tree Martins migrate to southern Australia from these northern islands, arriving in flocks about August, and departing towards the end of March. Some birds will remain in the south throughout a mild winter.

The nest is usually built in a hollow tree, or in a rock crevice or cave. Sometimes the birds utilize buildings but not as frequently as their relatives the Fairy Martins. A suitable hollow is lined with grass and leaves and a large entrance hole may be partly sealed off with mud. They usually nest in proximity to other Tree Martins but occasional pairs nest alone. Four or five white eggs are laid, some having a few spots of reddish-brown. The breeding season is from August to January.

## CAMPEPHAGIDAE
Cuckoo-shrikes, Trillers, Cicada-birds.

The name *Campephagidae* means 'caterpillar-eater', which is a more suitable name for this group of birds, considering that they are related neither to shrikes nor cuckoos.

They are a primitive group of insect-eaters whose antecedents and relationships are uncertain although, they may be distinctly related to the Old World flycatchers.

They are soft-plumaged birds and an interesting feature of the feathering is the patch of dense feathers on the lower back. These are so loosely attached as to suggest a defence mechanism like the easily detached feathers of certain pigeons and the expendable tail of many lizards.

They are soft-voiced birds as a rule, having a variety of churring calls, often uttered in flight. A somewhat aberrant member of the family is the Australian Ground Cuckoo-shrike which spends much of its time on the ground, whereas its relatives are largely aboreal.

The trillers are also cuckoo-shrikes in fact, although placed in a separate genus, the family includes the closely allied cicada-bird.

### CUCKOO-SHRIKES

Black-faced Cuckoo-shrikes, *Coracina novae-hollandiae*, are perhaps the most familiar of this genus. They may often be seen in suburbs where large trees are plentiful. They also have a soft churring call, usually uttered in flight.

The flight is buoyant and undulating, and when the bird lands it shuffles its wings a few times as though arranging them comfortably.

Out of the breeding season they may be seen in small flocks, and are partly nomadic, perhaps even migratory, in some districts. Their diet consists of insects, grubs and various berries.

They are faithful to a favoured breeding spot, some birds even returning to build in the very tree-fork previously used.

The nest is a slight, saucer-shaped platform of twigs and spider-webs, placed on the horizontal fork of a branch. It is usually about twenty to forty feet high but, may be as low as four feet. Three olive-green to pale olive-brown eggs spotted with umber, chestnut and grey, are laid. The breeding season is from August to December.

Little Cuckoo-shrikes, *C. robusta*, are found from eastern Queensland down to Victoria and south-eastern South Australia.

These are typical cuckoo-shrikes and may be seen in pairs or small parties outside the breeding season. They have the buoyant flight of the family and call 'kiseek-kiseek' as they fly. They appear to be nomadic, following the seasonal increases in insects and their larvae. Although they feed mainly in the foliage of trees, they also catch insects on the wing.

A small, flat nest is built on the horizontal branch of a tree, usually at a considerable height. The nest is constructed of light twigs and pieces of bark, bound together with spider-webs.

Two, or more rarely three, eggs are laid which are greenish, marked with brown and purplish-grey. The breeding season is from August to December.

The White-breasted Cuckoo-shrike, *C. hypoleuca*, is a tropical northern bird seldom extending as far as southern Queensland.

In pairs or, outside the breeding season, in small flocks, these pastel-grey birds inhabit lightly timbered park-like country. They are similar in their habits to the other cuckoo-shrikes, seeking insects and caterpillars amongst the foliage and occasionally foraging on the ground. Various native fruits are also eaten.

The nest is a small, flat platform of twigs matted together with cobwebs, and usually built on a fairly high horizontal fork of a tree.

Two bluish-green eggs which are blotched with brown and purplish-grey are laid. The breeding season is from October to December.

The Papuan Cuckoo-shrike, *C. papuensis*, is a bird of the north, as its name suggests. Outside Australia they are found in the Molucca Islands, Papuan Islands and New Guinea. Their Australian range is restricted to north-eastern Queensland from the Cape York Peninsula to the Cooktown district.

It is similar to the other cuckoo-shrikes in its habits, calling wheezily in flight and being mainly arboreal in its feeding. Their diet consists mainly of insects and their larvae. Open forest country and coastal mangroves are the typical habitats of this cuckoo-shrike. The nest and eggs closely resemble those of the White-breasted Cuckoo-shrike.

The Gascoyne Cuckoo-shrike, *C. gascoynensis*, is found in the vicinity of the Gascoyne River in mid-western Australia. This bird is now known to be but a paler northern race of the Black-faced Cuckoo-shrike and not a full species. The bird figured in the illustration is an immature specimen of the pale type. It was one of these that was described as a separate species. Neither the nest nor the eggs of the northern form have been described although they will probably prove to be similar to those of the Black-faced Cuckoo-shrike.

The Barred Cuckoo-shrike, *C. lineata*, is distinctively barred on the breast and could only be confused with the Ground Cuckoo-shrike which is a larger bird and more terrestrial in its habits.

The Barred Cuckoo-shrike is found through eastern Queensland down to north-eastern N.S.W. Frequenters of open forest country and light scrub, they are typical cuckoo-shrikes in habits. They appear to be nomadic or partially migratory; in northern N.S.W. they are common spring-time birds but are seldom seen in winter.

Their bubbling chattering cry is a pleasant call and, like the Black-faced Cuckoo-shrike, they sometimes live in proximity to human habitation. Their diet is a mixed one of insects, wild figs and other native fruits and they are said to be particularly fond of stick-insects.

A shallow hollow platform of small twigs and rootlets, bound together with spider-webs, is constructed for a nest. It is placed on the horizontal fork of a tree, usually quite high. Two white eggs form a clutch and these are spotted with brown and purplish-grey. The breeding season is from October to January.

Ground Cuckoo-shrikes, *Pteropodocys maxima*, are somewhat aberrant members of the family and are placed in a different genus. They are far more terrestrial than their relatives, although the other cuckoo-shrikes do forage on the ground occasionally. They have fairly long tails and are rather stout legged birds. When they are on the ground they walk and run rather than hop.

They are distributed throughout the interior of Australia generally, becoming less common in the north. They seldom visit coastal areas except sometimes in the west. These cuckoo-shrikes are often seen in small flocks or family parties and they frequent sparsely timbered country-side.

Their call notes have been described as a high pitched 'chee-er, chee-er', and 'kee-lik, kee-lik'. The alarm call is a loud 'queel'. They frequently call whilst on the wing.

Ground Cuckoo-shrikes are not common but, where they do occur, they tend to gather together, sometimes even nesting in proximity. They carry their communal existence to the stage where a number of adult birds will be found indiscriminately feeding the young birds of two or more nests that are built close to each other.

The saucer-shaped nest is usually placed in the horizontal fork of a branch up to seventy feet or so from the ground. It is built of grass and other plant stems, wood rootlets and similar material, with the whole bound and matted together with spider-webs. Occasionally a bird will build on the old nest of a chough or mudlark.

Three dull green eggs are laid with numerous clouded markings of olive-brown. The breeding season is from August to December.

## TRILLERS

Included in this family are the two trillers, one of which is a migrant and the other a nomadic resident.

The White-winged Triller, *Lalage sueurii*, is found throughout the continent generally, but is considered to be a very rare visitor to Tasmania. These birds migrate to Australia from New Guinea and Timor, reaching the southern limits of their journey about September and departing again in February.

On the wing the bird often whistles its call of 'joey-joey' as it flies buoyantly amongst the scattered timber.

In some years these birds are noticeably common but are inexplicably scarce during others. The diet of this triller is insects and caterpillars for which it hunts amongst foliage and on the ground. Although such a conspicuous black and white bird, the male is responsible for much of the nest building and incubating.

The nest is a typical 'cuckoo-shrike' platform of light twigs, rootlets and grasses, bound and matted together with cobwebs. It is built into the horizontal fork of a branch at any height from a few feet to thirty or so.

Three bluish-green eggs heavily marked with chestnut brown are laid. The breeding season is from September to January or later.

Varied Trillers, *L. leucomela*, are found in the coastal areas of the Northern Territory, eastern Queensland and down as far as north-eastern N.S.W. Unlike the previous bird, they are not migratory, but they do appear to be nomadic in degrees depending on local conditions and insect populations. Also they are less vociferous birds than the White-winged Trillers. Their chief call being a soft insect-like 'karr-r-r'.

These birds feed on insects and their larvae, and various native fruits, which they hunt for on the ground and through the foliage. The edges of jungles and scrub are the typical habitats of these trillers.

The nest is a small saucer-shaped platform of rootlets and grass, bound together with spider-webs, and it is usually built into the horizontal fork of a branch only a few feet from the ground. One green egg spotted with chestnut is laid, and the breeding season is from October to January.

## CICADA-BIRDS

Cicada-birds, *Edoliisoma tenuirostre*, are found around the coastal areas of Australia from the Kimberleys across the north of the continent and down the eastern states to north-eastern Victoria.

These birds are migrants within Australia, moving south in the summer. They arrive at the southern limits of their range early in October and depart again about March.

They are fairly elusive birds and may be heard more frequently than they are seen. The male has a loud, rather cicada-like buzzing call and there is also a 'chuck-chuck'

cry. Cicada-birds do feed on cicadas, plus other insects and caterpillars, which they gather from the foliage of trees.

The nest is surprisingly small, only about three inches across, and is made from small twigs bound together with cobwebs and decorated (or camouflaged) with lichen. The bird usually builds in a horizontal forked branch from thirty to seventy feet up. Sydney is about the highest latitude that Cicada-birds regularly nest and although the birds are not uncommon in north-eastern Victoria they rarely nest there.

Male Cicada-birds are very bold and aggressive if the nest is approached by a predator or human.

One egg is laid and it varies from pale bluish to green-grey, with umber and grey-brown markings over lavender. The breeding season is from October to January.

## DICRURIDAE
Drongos

There are twenty species of these Old World arboreal insect-eaters found scattered from Africa through southern Asia to India and China. Drongos also range southwards to Australia where they are represented by one species.

They tend to be conspicuous birds, sitting in the open on a stump or telegraph wire, from which they make forays after insects. These are carried back to the perch to be devoured. Large insects are held down with one foot and pulled to pieces. Drongos are bold birds, fierce in the defence of their nest and territory against such marauders as hawks and cats.

The name drongo is the native name for the Coucal species in northern Madagascar, and has now been applied to the whole family.

### DRONGO

The sole representative of this family in Australia is the Spangled Drongo, *Chibea bracteata*. It is found from north-western Australia to northern Queensland and southwards to eastern Victoria. Drongos are considered to be accidental wanderers to Tasmania. Outside Australia this species also occurs in New Guinea.

These handsome, glossy birds are frequenters of both the jungle and the more open forest country. They tend to be migratory, coming down from the north in October and departing again in March. On the whole they are a northern species, but a few spread down as far as south-eastern N.S.W., and more rarely, into the east Gippsland forest country of Victoria. In the north a few birds remain with us all the year. A Drongo will usually be seen perched on some exposed vantage point from which it makes sallies in pursuit of insects. Launching out, it flies strongly, twisting and banking after a flying beetle or large butterfly. The prey is brought back to the perch and devoured there. Small birds are sometimes attacked and it also supplements its diet with berries and other fruits.

It is very noisy, with its scolding chattering notes, uttered both while perched and in flight. Some birds are also quite able mimics. The nest is an open shallow saucer,

composed of vine-tendrils, rootlets and plant stems. It is usually built into the thin forked branch of a bushy tree at heights of up to fifty feet or so. Three to five eggs are laid which vary from pinkish-white to pale purplish-grey, spotted with pinkish-red. The breeding season is from October to February.

## ORIOLIDAE
### Orioles

The word oriole is an English derivation from the Latin *aureolus*, which means yellow or golden. Applied originally to the brightly coloured Golden Oriole of Europe, the name is now also collectively used for thirty-odd species of Old World birds which appear to be related to the crows.

They are forest birds which feed on fruits and seeds, and have loud fluting calls. Many orioles, including the Australian species, mimic the songs of other birds.

The two fig-birds of Australia are also included in the *Oriolidae*, although they are considered to be aberrant and are placed in a different genus. These two species are more gregarious than the typical orioles and a distinctive feature is the coloured bare skin about the eyes and lores.

### ORIOLES

The Yellow Oriole, *Oriolus flavocinctus*, is a tropical bird, found from Derby in Western Australia to Cardwell in Queensland. This oriole is usually seen singly or in pairs foraging through the thick tropical foliage in search of the fruit and insects upon which it feeds. Jungle growth in the vicinity of streams is a favoured habitat.

Its rich bubbling call may be heard more often than the bird is seen. They sing quite frequently through the day and interlace their song with mimicking other birds.

The nest is a neat cup of soft bark, vine-tendrils and small twigs, lined with rootlets. It is usually suspended at heights up to fifty feet in the thin outer branches of a tree. Two pale creamy eggs with blackish-brown and pale grey markings are laid. The breeding season is from September to December.

SPANGLED DRONGO
12 in.

The Olive-backed Oriole, *O. sagittatus*, is found in northern and eastern Australia and in the south as far west as Adelaide. These birds are similar in their habits to our other oriole. They frequent open forest and brush country where they may be seen hunting in the foliage for various native fruits. The song is described as 'rolling, somewhat monotonous notes'. Like most other orioles, the Olive-backed birds are also competent mimics of other species.

OLIVE-BACKED ORIOLE
11½ in.

YELLOW ORIOLE
11½ in.

The nest is a deep cup of neatly woven strips of bark, leaves and grass, which is lined with dead grass. It is usually attached to the thin outer twigs of a tree, at any height from four to sixty feet above the ground. Two to four eggs are laid, although three is the normal clutch. The eggs are a pale cream with various shades of umber and slate-grey markings. The breeding season is from September to January.

### FIGBIRDS

Southern Figbirds, *Sphecotheres vieilloti*, are restricted to eastern Australia from the neighbourhood of Cairns down to the Sydney area; only rarely are they seen in Victoria.

These Figbirds frequent brush country and tracts of open forest, and to some extent, they have invaded settled areas where suitable cover occurs. They travel in noisy flocks, drawing attention to themselves with their constant chattering notes. Numbers of them will sometimes invade orchard country, devouring such soft fruits as mulberries and figs. In the wild their diet consists of various native berries and other fruits, including wild figs.

An open cup-shaped nest is built of vine-tendrils, plant stems and a few small twigs. It is a scanty construction but is strongly woven into the drooping twigs of an outer branch at heights up to seventy feet or so. Three eggs is the normal clutch and these vary from pale apple-green to dull olive,

with reddish or purple-brown markings. The breeding season is from October to January.

The Yellow Figbird, *S. flaviventris*, unlike the other figbird, is not found very far south, but is confined to the Northern Territory and north-eastern Queensland.

In pairs or small flocks they frequent most types of forest and big scrub where fruit bearing trees and vines grow.

There is a frequent nesting relationship between this Figbird and the Drongo or the Helmeted Friar-bird. As both the latter species are pugnacious towards other birds and marauders of all kinds the figbird no doubt receives a good deal of fortuitous protection.

The Yellow Figbird's nest is a saucer-shaped construction of long pieces of vine-tendril lacing together a few twigs. No lining is used, and the nest is attached to the drooping twigs of an outer branch, at heights up to fifty feet or so. Three eggs are the normal clutch and these are a greenish colour, spotted with reddish-brown or purplish markings. Much of the patterning on these eggs has the appearance of being beneath the surface of the shell. The breeding season is from October to January.

## CORVIDAE
### Crows and Allied Birds

Amongst this family of birds are some of the birds best known by the general public. They are regarded with mixed feelings, probably with the scales weighted against them in general. Crows and ravens have usually been associated in literature with the sinister or the mysterious and most farming people regard them with disfavour.

In most countries crows have thrived in spite of (perhaps in some cases, because of) man and his activities. They are omnivorous feeders and show great sagacity in avoiding danger and traps. Most people in the country feel that a crow or a raven can tell the difference between a man with a gun and one without; these birds are even said to be able to distinguish between a gun and a stick.

The *Corvidae* are considered by many ornithologists to have highly developed brains and for this reason they are often placed high on the evolutionary scale, as explained in the section on classification at the front of this book. Much of the evidence supporting 'intelligence' is rather anthropomorphic, although the family does show considerable learning and adaptive ability. They also appear to 'play', like the ravens on Gibraltar. I have an eye-witness account of these birds disporting themselves on a flight of steps. A number of them would spend considerable time hopping up one of the long flights of steps on the Rock, giving a 'caw' at each jump. Upon reaching the top each bird would turn and launch itself into space to glide down to the bottom and start its next ascent. It would be difficult to explain such unproductive behaviour except in terms of recreation.

Most of the *Corvidae* will become quite tame, especially if reared from nestlings, and with patience they can be taught a few words.

In parts of the world other than Australia the family *Corvidae* contains species other than the crows and ravens. Magpies are members of the family and so are jays, choughs and nutcrackers. None of these are represented in Australia, in spite of the vernacular names being used here. Our magpies for example, being so named because of their black and white superficial resemblance to the European magpies.

### CROWS

The Crow, *Corvus cecilae*, is found throughout northern Australia and south to northern South Australia; also Western Australia and occasionally in Victoria. In the latter state it extends further south but not into the south-west corner which is the domain of the Raven. These birds are found in most types of country where they are likely to be able to find food. Mountain ranges and tree-bordered waterways are probably their favourite haunts. Crows are also common on some beaches. They are omnivorous feeders, taking carrion of all kinds, insects, small animals, young birds and eggs and fruit including cultivated varieties.

Crows are persecuted a good deal by pastoralists, but apparently with little effect on their numbers. They are accused of killing lambs but rarely do so. Their activities in clearing up carrion must contribute significantly to the control of blowflies. A crow may be distinguished from a raven by the snow-white bases to the body-feathers. The call is a varying number of short 'ka-ka-ka' sounds.

The nest is a solid construction of sticks and twigs with a deep cup. It is lined with grass, horse hair or wool. It is usually high in the forked branches of a tree but in treeless country may be on a telegraph pole or on the platform of a windmill pump. Four or five, and more rarely six, eggs are laid. These have a pale bluish ground colour and may be unmarked or speckled with varying amounts of blackish and olive-brown. The breeding season is from August to January.

It should be stated that both of the crows in Australia and the Raven are brown-eyed when immature, and develop white eyes when fully adult—in spite of the various light and dark-eyed 'species' of popular opinion. Younger birds also have flesh-colour inside the mouth rather than brown.

The Little Crow, *C. bennetti*, is found generally throughout the interior, extending to coastal districts in north-western Australia. They are usually seen in pairs or small groups and in most types of country. They are noticeably smaller than the Crows and may sometimes be distinguished by the brownish hue on the plumage of immature birds. They are often not as shy as the other *Corvidae*.

The call is said to be shorter and coarser than that of the Raven and 'usually ends in a warble or yodel' (Serventy).

The Little Crow might be confused with the much more rare Indian Crow which is sometimes found in Western Australia. The Indian Crow is, however, distinctly ash-brown on the nape, breast and upper back.

The Little Crow shows some tendency to gregarious nesting, with a number of birds sometimes building within fifty yards or so of each other.

The nest is built of sticks and twigs and the fairly deep cup is lined with feathers, soft bark, fur or wool, or a combination of these. In Western Australia (and presumably in other places) this bird builds a clay lining into its nest between the sticks and the soft inner lining.

The eggs are distinctly smaller than those of a crow and are profusely scattered with spots and blotches of olive brown over a light blue or green background. The clutch varies from four to six or seven and the breeding season is from August to November or later.

Because of the similarity between this bird and the larger Crow, it was not noticed nor described as a species until A. J. North did so in 1901.

The Raven, *C. coronoides*, is distributed from the Rockhampton district in Queensland down through south-eastern Australia to South Australia on the Eyre Peninsula. This bird is also found in the south-west corner of the continent and is common in Tasmania.

In the country, ravens are wary birds and difficult to approach, although in the suburbs they often take little enough notice of humans. They are birds of the open country on the whole, 'flighting' at dusk, back to some

RAVEN 20 in.

LITTLE CROW 18½ in.

nearby wooded area to roost. Ravens have a variety of hoarse cawing notes that are a familiar sound in most parts of the bush.

Omnivorous by necessity, they seem to prefer a flesh diet when it is obtainable. They are great scavengers and even visit beaches quite often in search of tide-line offal.

Large numbers of insects are consumed by these birds but they are still most unpopular with farmers and graziers because of their depredations amongst lambing ewes. They are also considerable robbers of birds' nests, taking both young and eggs.

Ravens are rather larger than crows and have strongly lanceolate feathering under the throat. They may also be identified (in the hand) by the dusky bases of the body feathers compared with the snow-white of the crow.

The nest is a bulky, untidy structure of sticks and twigs with a deep cup. This is lined with grass, wool, fur or any other soft material. It is usually built high in the upright forked branch of a tree but may be on a telegraph pole or other prominence. It is not unknown for Ravens to nest upon the ground when there is no alternative.

Four to six pale greenish or bluish eggs are laid, freckled and blotched with blackish-brown and umber. The breeding season is from June to December.

## GRALLINIDAE

Mudlarks, Choughs, Apostle-birds

This is a rather loose, and to some ornithologists, unsatisfactory group. The tree birds are placed together largely because they build mud-nests, but apart from this, they do not appear to have any other affinities and are all placed in separate genera. There is also a fourth species, the Papuan Mudlark.

### MUDLARKS

The Mudlark or Magpie Lark, *Grallina cyanoleuca*, is probably the best known of this family to many people. It is found throughout most of Australia where there is fresh water and is a common bird in most towns and cities. The mudlark is a useful species, as it feeds on many species of harmful insects. It also eats the Fresh Water Snail which harbours the Fluke parasite that causes damage to the liver in sheep and cattle.

Their loud calls are also well known and they are one of the few species to sing in duet. Two birds will perch up in the branches of a tree, one calling 'tee-o-wit' and the other immediately answering 'tee-tee'. It is a high, somewhat raucous sound and difficult to describe. As they call in perfect time they vigorously open and shut their wings in synchronisation. The 'tee-o-wit' call is also uttered as the birds fly. Mudlarks pair for life and will nest in the same place in successive years, even repairing their old nest or building on the same bough.

Out of the breeding season they congregate in flocks which may be very large—there are records of five hundred birds, but thirty to fifty is probably more common.

Their flight may be erratic and lapwinged, especially when they are excited, or direct with a full flapping motion of the wings. In the spring, Mudlarks indulge in wild aerial antics. Two or three birds will chase each other at great speed in and out of the tree-tops with amazing agility. Now and then they will tower up into the air, twisting and turning and almost tumbling about in space, before plunging back to tree-top level. They call as they go, and one bird might perch for a moment to give full voice, until almost knocked off the branch by a power-diving companion. The nest is a mud bowl built onto a fairly stout branch or limb, and usually near or overhanging water. It is reinforced with grass and lined with grass or occasionally, feathers. Very frequently the Wagtail will build its nest on a lower branch of the same tree or one near by. Three to six eggs are laid which vary from white to pinkish or reddish-white; these are speckled with reddish-purple over slate-grey. The breeding season is from July to January as a rule, but in various districts occupied nests may be found in almost any month.

### CHOUGHS

The White-winged Chough, *Corcorax melanorhamphus*, inhabits the inland areas of central Queensland, N.S.W., Victoria and South Australia. In some places in N.S.W. its range extends to the coast.

These rather mysterious birds are usually seen feeding in small parties on the ground. When approached, they fly up into nearby trees with strange grating cries and mournful whistles. They are very restless and hop heavily from branch to branch elevating and spreading their tails and staring down out of deep red eyes. As they fly the large white area on the wing is very noticeable. If one of a party of these birds is shot or wounded in some way its fellows do not fly off but hop around the fallen bird calling in a dismal hooting manner.

Choughs feed on insects and their larvae which they sometimes dig deeply for in the ground, and they also take seeds and berries. They have also been known to raid the nests of other birds for the young fledglings.

The nest is a rather large bowl-shaped mud or cow-dung construction which is reinforced with grass. It is usually lined with dry grass, bark-fibre or pieces of wool and built on a sturdy branch at heights from twenty to sixty feet. A number of birds will co-operate in the building of a nest which will then be laid in by two or more hen birds. The young will also be raised by a group of adults. A pair of choughs, however, will quite frequently nest on their own.

The number of eggs found varies from two to nine, depending on how many birds are using the nest. The eggs are a pale creamy-white with olive, blackish-brown and slatey markings. The breeding season varies with conditions but is usually some time between July and February.

### APOSTLE-BIRDS

Apostle-birds, *Struthidea cinerea*, are normally inland birds and are distributed from the east of the Northern Territory across Queensland and N.S.W. Only rarely do they visit coastal districts and only occasionally do they reach Victoria or South Australia.

These birds have a number of names in the country areas, usually derived from their habit of travelling in small flocks; Twelve Apostles, Lousy Jack and Happy Family Bird are typical. Actually it is surprising how often they are seen in groups of a dozen or close to that number.

They frequent open, lightly timbered country as a rule, and often a flock will 'move in' to the grounds of a homestead and soon become quite tame.

Most of the Apostle-bird's time is spent on the ground, where it struts and hops heavily about in a rather amusing manner.

If disturbed the flock will fly up into the nearest tree and leap along from branch to branch, all calling harshly as they go. They feed on insects and seeds.

The nest is a basin of mud similar to the nests of the other members of this family. It is built on top of a strong limb at heights up to forty feet. Like the chough, these birds are also communal nest-builders.

The number of eggs varies from four to eight or so, depending on the number of females laying in the one nest. The eggs are a pale bluish-white marked with blackish-brown and grey. The breeding season is from August to December.

## CRACTICIDAE

Magpies, Butcher-birds and Currawongs

This family contains only ten species, all of which are confined to Australia and the Papuan area. As a group they have affinities with the *Corvidae*, and may have developed from early Tertiary magpie-like ancestors.

The Australian 'magpies' are not related to the birds of that name in Europe but to a genus peculiar to Australia, and known, more strictly, as piping crow-shrikes, although

it is extremely unlikely that their more popular name will ever be changed.

Magpies are common birds and have adapted quite readily to living in closely cultivated country and have also moved into towns and cities. They visit suburban gardens and city parks quite freely, and indeed, often nest in such places. During the nesting season these birds become very pugnacious and territory conscious. They will drive off most birds and attack cats, dogs and humans with a great show of ferocity. Diving low at an intruder the birds will strike with their wings or bill, and it is a quite unnerving experience to be the recipient of these attentions.

The voice of the magpies is justly famed, and the bird is considered by many people to be one of our best songsters. Alfred Russel Wallace, a great naturalist and traveller, felt that no European bird was a more gifted songster. The rich medley of warbling notes certainly has a wild and splendid sound, especially when heard on a fine spring morning or on moonlight nights.

Magpies have some strange nesting habits, especially in country where there are few trees. They build on telegraph poles to such an extent in some areas that the authorities have been obliged to put up nesting-baskets for the birds. Odd materials such as old lengths of cloth and large pieces of paper are often used. Some nests found have had varying amounts of wire in them, or have even been entirely of wire.

The butcher-birds of Australia look rather like miniature magpies and also have very beautiful voices, more gentle and perhaps more melodious than the magpies'.

They have a powerfully hooked tip to the upper mandible which gives a clue to their predatory habits. They attack small birds and also reptiles, small mammals and insects.

Some of the species at least, have the shrike habit of impaling their prey on a thorn or any other sharp protuber-

ance, to be returned to later. A number of small creatures may be hanging in the butcher-birds' larder at the one time: small birds are impaled through the neck usually, and insects through the body. The fork of a branch may be used when suitable spikes are not available.

The Currawongs are a group of large dark birds with heavy bills, which on first sight closely resemble crows.

They are loud-voiced birds, with a variety of clinking and clanging notes. The name derives from the 'currawong-currawong' call of the Pied Currawong. An alternative name for the group is Bell-magpies. Some species are found high in mountainous country. Their clanging voices, ringing out over the snowy, mist-shrouded slopes sound quite eerie.

Like the butcher-birds, they are rather inclined to attack smaller birds and rob their nests of eggs and young birds; they are also said to raid chicken-runs at times.

## MAGPIES

The White-backed Magpie, *Gymnorhina hypoleuca*, is found from south-eastern N.S.W. down to Victoria and southern South Australia; they are also common in Tasmania but are rarely seen in Queensland.

These large, conspicuous and well-known birds appear to have increased with the development of agriculture as they are particularly fond of well-grassed open country that has scattered timber.

They are very fierce birds in defence of their nesting territory and will attack humans almost as readily as they will set upon another bird or mammal.

Magpies are beneficial birds about the countryside, being great destroyers of all kinds of insects. The carolling song of these birds is also a welcome sound wherever it occurs. Sometimes a number of birds will sing in company—almost it seems, in competition—usually at dusk or early morning. On warm clear nights also, a magpie will often chortle out a few notes, or sometimes burst into a full rich song.

The nest is a fairly large untidy structure of sticks and often other odd pieces of material such as wire, paper and cloth. It is built into the fork of a high branch as a rule, but may be as low as fifteen or twenty feet. If no trees are available they will build in windmills or on telegraph poles. Three to five eggs are laid which vary considerably in ground colour. They may be greenish or blue-white, reddish-grey or dull brown, with streaks and spots of chestnut. The breeding season is from July to February.

The Black-backed Magpie, *G. tibicen*, is found in the main where the other two magpies are absent. In Western Australia it is, however, the northern species, coming as far south only as Onslow and the Gascoyne district.

The northern magpies of any species are much shyer than the southern birds, and are seldom heard to sing.

Black-backed Magpies are slightly smaller than their relatives and have a noticeably longer and more pointed bill.

The nest is similar to those of other magpies; a construction of sticks, usually high in a tree and lined with any kind of soft material available. This bird's eggs show great variation. H. L. White, in describing eggs for Mathews' *Birds of Australia*, gave details of twelve different clutches. The basic difference between the eggs of this bird and the other magpies appears to be that, in the case of the Black-backed, the patterns are spotted, rather than streaked or smeared. Clutch numbers and breeding season are similar to those of the other magpies.

The Western Magpie, *G. dorsalis*, is confined to the south-west of the continent, extending north only to about the Ashburton River—the mulga, eucalypt line.

Their carolling song is as beautiful as that of the eastern

bird and often a number of birds will sing together.

Studies of this magpie have shown that, instead of pairs of birds defending their nesting territory, groups of magpies will defend whole areas, up to 100 acres or so. The birds are permanent residents within their territory which is defended by males, females and immature birds alike, although the males are the most aggressive.

The beautiful carolling of their communal territory-song reaches its peak just before nesting begins. Once the eggs are laid the magpies become much quieter.

Nests are built of sticks and twigs and lined with any soft materials available such as grass or wool. They are placed high in a forked branch as a rule, but a telegraph pole or other high place will suffice where there are few trees.

The eggs are not so variable as those of the other two magpies. Bluish or greenish in ground colour, they are well blotched and smeared with purplish-brown and slate. The breeding season is from July to December.

## BUTCHER-BIRDS

Australian butcher-birds are divided into either four or five species by various ornithologists; some considering the Silver-backed Butcher-bird to be but a *form*, intermediate between the Grey and the Pied Butcher-birds.

The Grey Butcher-bird, *Cracticus torquatus*, is found from the Gulf of Carpentaria to south-eastern Australia and across to South Australia: it extends north to Alice Springs and the Ashburton River and out to the coast in mid-western Australia. This butcher-bird is also common in Tasmania, where it moves into suburban and city gardens in the autumn.

Elsewhere in Australia its autumn song is also its richest. Considered by many to be one of our best songsters, the bird has a series of rollicking warbling notes and loud whistles.

They have the shrike-habit of making a 'larder' wherein they hang small lizards, insects, mice and birds, to be returned to when the butcher-bird is hungry. Their prey is impaled on a thorn or other sharp spike, and such a spike is used by the bird to help it in tearing up its food. Butcher-birds will also wedge their prey into a forked branch for the same purpose.

They are bold birds, and will even kill caged birds and drag them out through the wires of the cage. The boldness of the Grey Butcher-bird and its relatives also makes them tameable, and they can often be trained to feed from the hand. A cup-shaped nest, rather untidily constructed, is built in the fork of a branch, from a few feet up to sixty feet off the ground. The nest is neatly lined with rootlets and fine grass and three, four or more rarely five, eggs are laid. These may be grey-green, grey-blue, olive or light brown, marked with dull reddish-brown. The female does most (perhaps all) of the incubating, and is sometimes fed at the nest by her mate. The breeding season is from August to January; or from April to May, depending on locality.

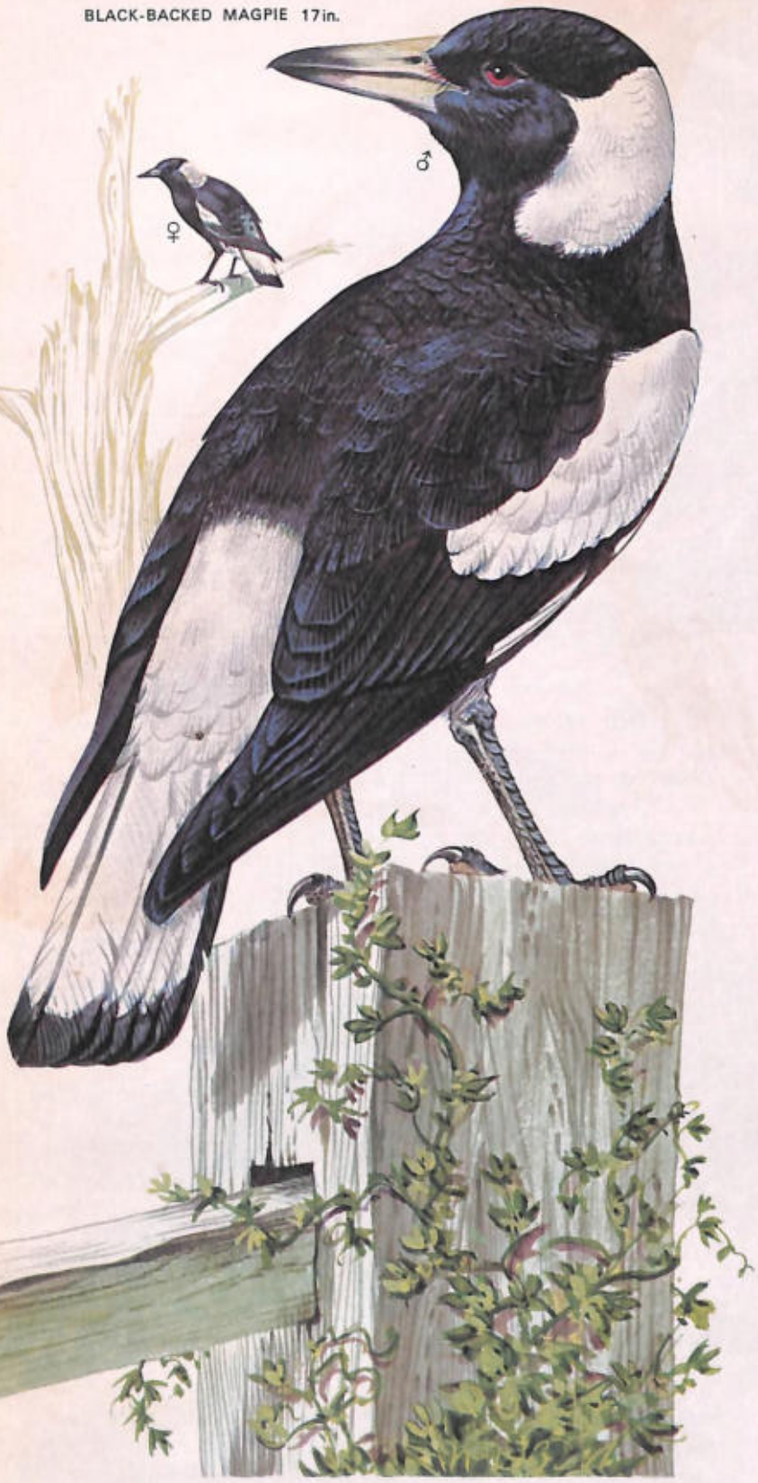
Silver-backed Butcher-birds, *C. argenteus*, are a race, intermediate between the Grey and the Pied Butcher-birds. They are restricted to the Northern Territory and the north-west of Australia. Their song is similar to that of the Grey Butcher-bird, and so are their habits.

The nest is an open cup of twigs and roots built usually about twenty feet from the ground, in the fork of a tree. The nest is lined with fine rootlets or dead grass and three pale grey-green eggs are laid; these are spotted with burnt sienna, chiefly at the larger end. The breeding season is from August to January.

The Black-backed Butcher-bird, *C. mentalis*, is a northern species. It is distributed through north-eastern Queensland from the Rocky River district to Cape York. This butcher-bird is also found in New Guinea. It is similar in habits to its relatives and presumably keeps a 'larder' of impaled birds, insects and other small creatures. The song is a rather weak imitation of the Grey Butcher-bird's rich chortling cry. In my experience it appears to be a common occurrence that the northern representatives of a family have a noticeably less developed song than the southern birds.

These butcher-birds nest in forest country, building a cup-shaped nest of sticks which they line with strong grass-roots. It is placed in the forked branch of a tree, at heights of thirty-five feet or more. Three eggs are laid as a rule, and these are greenish-grey or pale brown, with reddish-brown and slate markings. The breeding season is from October to December.

Pied Butcher-birds, *C. nigrogularis*, are found throughout




most inland parts of the continent except for the deserts. They are absent from the south-west corner of Western Australia, the south-east of the continent and southern South Australia.

These butcher-birds are quite magpie-like in general appearance. They have a fine song, strong and fluting, in the typical butcher-bird manner; they are also able mimics of the songs of some other birds. Pied Butcher-birds will often sing on a fine night, when, by contrast with the silence, their notes sound even richer.

They are bold and vigorous in the defence of their nests, like the other butcher-birds, and show little fear of humans under these circumstances. Their food is insects, which they mostly catch on the ground, and also small mammals, lizards and birds.

The nest is a fairly deep open cup of sticks and twigs, lined with dry grass and rootlets. It is built into the vertical fork of a tree branch at heights around forty feet. Three to five eggs are laid which are greyish-green, pale olive or pale brown. These are spotted with darker brown and a few black spots. The breeding season is from August to December.

The Black Butcher-bird, *C. quoyi*, is confined to the Northern Territory and northern Queensland, where it comes south to about Mackay. These birds are also found in New Guinea.

These interesting birds have two distinct colour-phases: a black and a reddish-brown. Both colours will sometimes occur in the same brood of young birds but black is the most common colour. This butcher-bird tends to be a coastal species, inhabiting mangroves and the scrub a short distance inland.

Like the other butcher-birds it is aggressive and bold. The song is rich and deep and has an attractive bubbling quality. The diet of the Black Butcher-bird is largely insects and crustaceans.

The nest is an open cup-shaped structure of twigs, built into the upright fork of a tree, and usually about twenty feet from the ground.

Four greyish-green or cream eggs with spots of umber and slate-grey are laid. The breeding season is from October to January.

## CURRAWONGS

The currawongs are a group of five rather similar looking blackish-grey birds which superficially resemble the *Corvidae* but are not closely related to them.

The Pied Currawong, *Strepera graculina*, inhabits eastern Australia, from the inland areas of Cape York to Western Victoria. Out of the nesting season these birds tend to flock, sometimes gathering in large numbers. These flocks frequently invade towns and suburbs in their search for food. Sydney suburbs, in particular, being invaded during the winter. They are often something of a pest, raiding orchards and poultry runs.

In the country they inhabit forest country, both in the lowlands and in the mountain ranges. Pied Currawongs are some of the common winter birds above the snow-line and may be heard calling across the foggy slopes. They are vociferous at dusk or all day if the light is poor. It is from their call of 'curra-wong' that the group derives its name.

Their diet in the wilds, consists of native fruits and insects, and they also destroy the young and eggs of other birds.

The nest is a large open structure of twigs and sticks lined with rootlets. It is built in the outer branches of a tall tree. Two to five, but usually three, eggs are laid.

These are usually pale brown, streaked with darker shades. The breeding season is from September to January.

The Black-winged Currawong, *S. melanoptera*, is confined to the Mallee areas of south-western N.S.W., western Victoria and eastern South Australia. It also inhabits Kangaroo Island.

This currawong frequents, and breeds in, timbered country in the spring, but resorts to more open areas in the autumn and winter. It is something of a pest in orchards, where it supplements its normal diet of insects with various fruits.

The call note is a vigorous, ringing whistle, which it usually utters in flight.

It builds a large open nest of sticks, lined with soft bark-fibre or dry grass. This is built into the upright fork of a tree, not usually very high, twenty feet being about average. The two or three eggs vary from pale buff-white to a rich brown; these are streaked and speckled with various shades of darker brown. The breeding season is from September to November.

The Black Currawong, *S. fuliginosa*, is very local in its distribution, being confined to Tasmania, King Island and the Furneaux Group in Bass Strait.

Except when in breeding pairs, these large birds travel in flocks. They are garrulous and bold, descending on gardens and bush areas alike, to feed. These currawongs are considered to be a pest by orchardists and gardeners as they destroy a good deal of fruit and damage other plants as they pass through. They are not averse to attacking chickens and ducklings if the runs are left open.

The nest is of the usual currawong type: a bulky construction of sticks, built into the upright fork of a tall tree. It is lined with rootlets and dry grass and two or three eggs constitute a clutch. These are a purple-buff colour, spotted with reddish-brown. The breeding season is from September to December.

The Clinking Currawong, *S. arguta*, is so-named because of its clinking call-notes. It is a Tasmanian bird but a few may reach south-eastern Victoria.

A common species, they move about the countryside in flocks, pairing off during the nesting season, but still congregating in small groups. They are seldom called currawongs in Tasmania, as none of their calls resemble the 'currawong' cry of the Pied Currawong. Black Magpie is a common name for them, and the Black Currawong is popularly known as the Black Jay.

During most of the year the Clinking Currawongs inhabit the lowlands, frequenting farms, open forest and orchards. In the winter they roam further afield going up into the mountain country, which is more the haunt of the Black Currawong.

The call of the Clinking Currawong resembles the sound of an anvil being struck, a variety of sounds like 'clink-clink' or 'kling-klang'. They feed on insects, native fruits and berries and do not seem to bother with orchard fruits as much as some mainland currawongs do.

A deep cup-shaped nest is built of sticks and twigs, lined with roots and other fine materials. It is usually high up on the horizontal branch of a tree. Three eggs are the normal clutch, and these vary from dull white to grey, with spots of pale brown over grey markings. The breeding season is from August to December.

GREY CURRAWONG 19in.
PIED CURRAWONG 18½in.
CLINKING CURRAWONG
19in.
BROWN
CURRAWONG
19in.
BLACK-WINGED CURRAWONG
19in.
BLACK CURRAWONG 18in.

Grey Currawongs, *S. versicolor*, are found from south-eastern Queensland to the south-east tip of the continent. There is also a population in south-western Australia.

During the autumn and winter they are gregarious, and rove about in flocks. They visit suburbs in these winter flocks and are not popular with gardeners. Their depredations amongst the apple-orchards and in other fruit crops makes them a pest in fruit growing areas also.

In Western Australia, Grey Currawongs were declining up until about 1950 and were seldom seen in the vicinity of Perth. More recently there appears to have been an increase in their population. The call-notes are various, some reported as 'clank-clank-clank' and other notes sounding gong-like. This bird also has a peculiar squeaky mewing cry. A shallow, cup-shaped nest of sticks and twigs is built high in a tree. It is lined with rootlets and coarse grass. Two or three eggs are the normal clutch. These are various shades of brown, usually pale, freckled with darker browns and greys. The breeding season is from September to December in the east but in Western Australia eggs may be found in the nest at any time from July to November.

The Brown Currawong, *S. intermedia*, is, as its name indicates, an intermediate form between the Black-winged and the Grey Currawong. Its habits are similar to both those species. Flocking in winter, the catholic diet, and loud ringing cries all being typically currawong-like.

The nest and eggs are similar to the species from which it derives. Brown Currawongs are local in distribution, being found only in South Australia. Their range is the Southern Yorke Peninsula, the Musgrave and Everard Ranges (S.A.), west to the Eyre Peninsula and a little beyond.

## PTILONORHYNCHIDAE
### Bower-birds and Catbirds

The bower-birds are a remarkable group of bird architects, that construct bowers which the male bird decorates and in which he courts the female bird; the males also appear to 'play' in these bowers, quite apart from any courtship displaying. No other birds in the world go to such trouble or build such elaborate structures that are not used for nesting. Some of these bowers are so large that it seems impossible that they could be built by one small bird: indeed, early explorers imagined that they must be the play houses of native children.

The most 'practical' use to which the bower is put is to attract the female bird as the male bird displays there; mating often takes place within the bower and this is usually the last that the male bird has to do with domesticity. The female goes off alone, builds the nest and rears the young. It may be that there is polygamy amongst bower-birds but this has yet to be proved.

Catbirds, which are closely related to the bower-birds do not build a bower. They have strange mewing calls and hissing alarm-notes and sound very much like cats.

Bower-birds can be divided into three groups according to the complexity of their bowers. Some build fairly simple platforms, another group build around the central support of a small tree and the third group build a walled avenue of sticks and sometimes paint the walls with a mixture of saliva and various natural substances.

Some of the second group, known as the 'maypole builders' construct the largest bowers. Golden Bower-birds in northern Australia often create structures that rear up nine feet high or so. This is all the more astonishing when one realizes that the bird is only nine inches long.

A bower such as the Golden Bower-bird makes, is started off with a pile of sticks around the base of a sapling, this is built up to a good height and then another, smaller pile is placed around a nearby tree. The two towers of sticks are linked by vines and sticks, sometimes to the extent of resembling a thatched roof. These bowers are kept repaired and are added to in succeeding years, which explains the size of some of them.

The habit that the third group have (the avenue builders) of gathering bright objects is well known. Shiny pebbles, pieces of glass, buttons, flowers, bones, almost any small thing, in fact, that glints or has a bright colour. Some birds favour a particular colour, the Satin Bower-bird for example, nearly always decorates with blue or yellowish-green objects and the Golden Bower-bird is fond of white; both these birds appear to have an antipathy to red.

### BOWER BIRDS

The Regent Bower-bird, *Sericulus chrysocephalus*, inhabits well-timbered country from the Mackay district in Queensland down to about the Hawkesbury River near Sydney. During the breeding season they pair off, but in winter and autumn they become quite gregarious; A. H. Chisholm says that the adult males will often make up flocks apart from the rest. They move through the scrub and forest, feeding on various

native fruits and a few insects.

The call of these bower-birds is a strange guttural 'te-arrr' drawn out at the end; a squeaky 'whit-whit' sound may also be uttered.

The bower of this species is not very large. The male bird clears a space and builds a platform of sticks, well flattened down. Constructed up out of the sides of this are two walls about ten inches long and a foot high. This bower is then 'painted' by the bird, using pulped vegetable matter mixed with saliva. A finishing touch is added with empty snail-shells and a few bright leaves and berries.

The Regent Bower-bird's bower is not often found, and many people believe that the bird is not such a regular builder as some of its relatives. The nest of this bird is a slight saucer-shaped construction of small twigs, lined with progressively thinner twigs. It is usually built into a mass of vine-growth or other thick foliage and may be from ten to forty feet or so above the ground. Two yellowish-stone coloured eggs marked with wavy lines and hair-like markings in black and purplish-grey are laid. The breeding season is from October to January.

Golden Bower-birds, *Prionodura newtoniana*, are found only in the mountainous country of north-eastern Queensland. These birds are very adept at mimicking the calls of other birds and they do so to a large extent. Their own calls are relatively simple whistlings.

Golden Bower-birds feed on insects and the fruit of various vines and shrubs. Although this is our smallest bower-bird it constructs the largest bower, often repairing it and adding material from season to season. The walls become quite thick and can reach the astonishing height of eight or nine feet, although four feet would be a more common height. One wall is usually carried up further than the other and a vine or two is draped across between them if there is no natural branch. Upon this, the male bird (who builds the bower on his own) displays and attaches decorations. White flowers are a common part of the decor and also blue-green pieces of lichen. The higher wall and the perch are usually the most decorated.

Some accounts of the bower mention it being roofed over with wines and sticks to form quite a substantial 'thatch'. Part of the male bird's display is his habit of hovering near the trunk of one of the supporting trees or near the higher wall of the bower. The nest is an open cup of dead leaves, skeleton leaves, and moss, woven together with thin strips of soft bark. It is lined with light twigs and

rootlets and placed in a niche or hollow of a tree in a dense part of the jungle. Most nests are low down, within four or five feet of the ground. The two eggs are white and the breeding season is from October to January.

The Satin Bower-bird, *Ptilonorhynchus violaceus*, inhabits eastern Australia from the Atherton Tableland to the Otway Ranges in Victoria. Living in pairs during the breeding season, these birds gather into small flocks during the autumn and winter. These groups are largely made up of females and young males and these birds are less shy than the fully mature, deep blue males. There is some evidence to suggest that the females attain the blue plumage when they grow old. (A. H. Chisholm: *Bird Wonders of Australia*)

These bower-birds are not uncommon in the coastal brush country throughout their range. The call of this bird is a vigorous 'cheroo' or 'whee-ooo' and a number of curious churring sounds. They are also habitual mimics, adding to their repertoire as they grow older.

In the autumn and winter, when in flocks, they sometimes raid orchards, doing considerable damage amongst soft fruits. The natural diet of these birds is wild fruit of various kinds supplemented with insects.

The bower is a platform of fine sticks and twigs, about a foot long, from which rise two walls fifteen to eighteen inches high. These walls are arched inwards and sometimes

meet overhead making a graceful vault. Whilst the bower is in use, throughout the spring and summer, decorations are constantly being added and perishable additions such as flowers are renewed. Satin Bower-birds are attracted by anything blue, which is interesting when one considers that the male is a deep blue and both sexes have a china-blue eye.

The following are the objects found in a Satin Bower-bird's bower, listed by Alec Chisholm:

Eight bluebags, 10 pieces of blue matchboxes, 1 blue cigarette packet, 1 blue envelope, 1 piece of blue string, 34 pieces of blue glass, 17 blue feathers, 1 blue marble, 1 ticket with blue printing, 4 blue chocolate papers, a blue invitation card, 8 yellowish wood-shavings, 2 pieces of yellow-green onion peel, 8 snail-shells, 1 cocoon, 6 cicada cases, numbers of blue and yellowish-green flowers and a very large quantity of yellowish-green leaves.

If such oddments are not available to a bird living away from human habitation, such things as flowers will be used, large numbers being strewn about the bower and constantly renewed as they wither.

There is one interesting case of a Satin Bower-bird turning predator. An aviculturalist found that a number of his blue-coloured finches were disappearing and he eventually discovered that a Satin Bower-bird in the same aviary was killing them and taking them off to decorate its bower.

The deep satiny blue plumage of the male is not assumed for some time (probably a number of years) and during this time the male's colouring is similar to the greens of the female: but at all ages, the juvenile male's green bill distinguishes him from a female which has a horn-coloured bill.

The young, green males construct rudimentary bowers and numbers of young birds will gather at these; sometimes as many as ten or fifteen of the green birds may be seen.

A sketchy bower may sometimes be found, which is sometimes as slight as a few sticks laid together in an open spot. It may be that this is made by a female or perhaps a young male.

There is nothing communal about the full-scale, decorated bower of an old male bird. It is jealously guarded and displayed in by the builder alone.

In the spring the display dance reaches its height. The bird stalks into the bower, rearranges a few ornaments perhaps and then begins to dance. With a churring sound, deep in its throat the bird steps along the platform; now with wings drooping to the ground, now raised until they arch above his shining blue black. With feathers puffed out all over his body, the bird then minces on tip-toe all about his stage, and all the time the churring note keeps up as a strange accompaniment to the weird dance.

In addition to all this, the Satin Bower-bird also paints the sticks of his arbour. Bringing a bundle of small pieces of fibrous bark to the edge of the bower, the bird then picks one up in its bill, drawing it right into his mandibles. The 'paint' appears to be vegetable juices or charcoal mixed with saliva, and the wad of soft bark is half paint brush and half cork, to retain the painting mixture in the bird's bill. Each stick along the wall of the bower will be carefully and slowly coated with the mixture. The nest of the Satin Bower-bird, built and attended upon entirely by the female, is an open rather shallow cup of small twigs lined with soft dry leaves. It is usually built into the fork of a tree or in a clump of mistletoe at a height of ten to fifty feet. Two, or sometimes three, eggs are laid that are a dark cream colour, spotted with brown and slate-grey. The breeding season is from October to December.

The Spotted Bower-bird, *Chlamydera maculata*, inhabits the interior of Queensland and ranges down through inland N.S.W. to north-western Victoria and the upper Murray River in South Australia. In some districts in Queensland it is also found near the coast where suitable habitats occur.

In pairs or small flocks these are birds of scrub and open forest country. Spotted Bower-birds will often settle

GOLDEN BOWER-BIRD

12in.

♂

♀

down for a time near homesteads, and become a nuisance in the garden and orchard.

These birds are remarkable mimics, with the accent on rather mechanical sounds. Such things as the twanging of wire-fences, the scream of a rabbit and creaking branches are all faithfully rendered. Dogs barking, the croak of frogs, rattling gravel and the whistling wings of crested pigeons are all on the list of mimicry.

There is a report of a bird imitating thunder so well as to deceive a person and another bird rendering the sound of three people all talking at once!

The bower of this bird is usually built beneath the low branches of a tree or shrub. It is an avenue or longish platform with the walls constructed of dried grass as a rule, and only rarely of sticks. Sometimes the tops of the walls droop over making an archway.

If this bower-bird shows a preference for any colour it is white; bones and pebbles being commonly brought to the arbour. An interesting fact is that, should any green berries brought in, turn ripe and become red, they are always taken away. Almost anything that the bird can pick up will be brought back to the bower, and the birds even steal things from houses and motor-cars. One bower in N.S.W. had 1,320 bones, and another contained approximately 2,500 snail-shells; all of which indicates considerable labour on the part of the bird.

The Spotted Bower-bird appears to use the bower throughout most of the year, and not just for spring-time displaying. In some cases, congregations of these birds have been reported at the one arbour.

Although it is not uncommon to find the bower of these birds, the nest is harder to find. It is a saucer of small sticks, lined with smaller twigs or sometimes with dry grass. It is built at heights up to about thirty feet in a bushy tree.

The two eggs are greenish-yellow covered with lines of umber and blackish-brown over grey markings. They are beautiful eggs, with the tracery of lines forming interesting patterns. The breeding season is usually from October to December.

There is an interesting account of the display of the Spotted Bower-bird in *Birds of Western Australia* (Serventy and Whittell) which is freely drawn on here.

The male bird fluffs out his feathers, and displays his beautiful pink mantle to great advantage. With harsh cries he advances into the middle of the playground, making a vigorous attack upon some decorative object lying nearby. He advances and retreats, hops from side to side and jumps into the air, and then with much apparent ferocity rushes at his female who stands close by. She will respond with a short harsh cry at times, but on the whole, appears to regard her mate's demonstrations as hardly worthy of notice.

This display may last for an hour or more and while it progresses, other bower-birds will squat about in the branches overhead, occasionally one of them might utter a harsh cry almost as though applauding or encouraging.

Eventually the displaying male hops up into the tree and the flock flies off together.

The mantle on the hind-neck mentioned above, is a rose or lilac-pink colour and is assumed by adult males and eventually by elderly female birds. This strange pink colour is very rare in the bird world, although this pink 'cape' is present in all the *Chlamydera*.

The Western Bower-bird, *C. guttata*, is a bird of the interior, found in mid-western Australia and central Australia, although the population may be separated by the Gibson Desert. Scrub and open forest country are their haunts and they may be seen in pairs or small flocks. In its general habits it is similar to the Spotted Bower-bird. The western

bird is also an able mimic. They build a bower and hold similar displays and gatherings to the spotted bird. The shells of inland snails are a common decoration and bleached bones, green berries and other fruits are often used. The nest is similar to that of the Spotted Bower-bird and two pale green-grey eggs are laid. These are covered with a network of fine dark lines. The breeding season is usually from September to December or sometimes as late as April and May.

The Fawn-breasted Bower-bird, *C. cerviniventris*, is a northern species, confined to north-eastern Queensland from Cape York to the Cape Flattery area. These birds are also found in New Guinea.

In pairs and small flocks they frequent scrub, open forest and also mangroves. They build a compact bower of sticks, with two walls, which they decorate with a variety of green berries and leaves.

This species is a competent vocal mimic with a wide range of imitations. Their food is native fruits and seeds of various kinds.

The nest and its situation is similar to that of the Spotted Bower-bird. Only one egg is laid, which is creamy-white, covered with a beautiful network and lacing of fine

dark lines which may be olive, brown, grey and black. The breeding season is from September to December, and sometimes to April and May.

Great Bower-birds, *C. nuchalis*, are tropical Australian birds, found from the Kimberleys across to Queensland in the Burdekin River catchment area.

In pairs or small flocks they frequent scrub and open forest. Their habits are similar to the other bower-birds in this genus.

The bower is usually constructed in an isolated patch of scrub. It is made of sticks, and a platform is laid down from which two walls are built up, forming an arched arbour, which may or may not meet at the top. As a rule, the bower is about two feet long, eight inches wide and with side walls about fifteen inches high.

White is the colour of most objects brought in to the bower by this species. Bleached coral, old bones and the shells of snails being the common decorations. The list includes many other oddments of a pale colour.

The Great Bower-bird will visit the area about a homestead and become relatively fearless. They are competent mimics, including a number of mechanical sounds as well as more natural ones in their repertoire.

The diet of these birds consists of native fruits supplemented with insects.

A nest is built similar to those of the other *Chlamydera* bower-birds. It is placed in the thickest part of the tree foliage, some twenty feet from the ground. One or two grey-green eggs covered with a tracery of fine, hair-like markings of dark browns and greys are laid. The breeding season is from September to February.

## CATBIRDS

The Spotted Catbird, *Ailuroedus melanotis*, is found from Cape York south to the area of Cardwell in Queensland. Outside Australia it occurs in southern New Guinea and the Aru Islands.

These birds pair off during the breeding season but in the autumn and winter they move about in small gatherings. The name catbird is given to these, and the other two species of catbird, because of the very cat-like yowlings and mewing cries which the birds have.

Spotted Catbirds feed on native fruits and berries, and perhaps they also eat insects. They do not build a bower although there are some reports of birds clearing a small area on the forest floor, and playing there.

A large, rather untidy nest is built, composed of long twigs, scraps of dead wood and large leaves. This is lined with small twigs and the stems of climbing plants. The usual site is the top of a thick bush or tree, hidden away in dense scrub, at a height of four to thirty feet or so. Two, or more rarely three, eggs are laid. These are a pale creamy colour without markings. The breeding season is from September to December.

Green Catbirds, *A. crassirostris*, are the most widespread of the three catbirds. They are distributed from south-eastern Queensland to eastern N.S.W. south to the Clyde River area.

In pairs or in small flocks they move through the brushes and big scrub, chiefly in coastal districts. They are sometimes seen in the company of Regent or Satin Bowerbirds. The diet of Green Catbirds is much the same as the bower-birds'; fruit of various kinds gathered from vines and shrubs. They are particularly fond of the seeds of bangalow and cabbage-tree palms and also take a few insects.

The strange cat-like 'me-ow' call of these birds is chiefly a dawn and dusk chorus and may be heard frequently when the birds are present. A low hissing note is also uttered and an odd little 'pick-pick' sound. Neither this bird nor the foregoing species is known to mimic bird-calls or other sounds. Nor is there any real proof of a play-culture such as the bower-birds have developed. Various bushmen, however, have reported that catbirds will clear a space in the thick scrub in which they will 'play'.

The nest is a fairly large bowl-structure of long twigs and stems of vines woven around a layer of broad leaves and, occasionally, a little moss. It is lined with fine twigs and placed near the top of a thick bush or in the thicker part of a small tree: usually at heights from ten to forty feet.

The two, or sometimes three, eggs are cream or a pale creamy-white, and the breeding season is from September to January or sometimes February.

The Tooth-billed Catbird, *Scenopoeetes dentirostris*, is restricted to the mountainous areas of north-eastern Queensland, from Cooktown to the Mount Spec area near Townsville.

Unlike the other two catbirds, this species does make a definite displaying and 'play' area. The bird is placed in a different genus from the other catbirds and is considered to be something of a link between this group and the true bower-birds.

No bower is built but, a large, roughly circular area, is cleared on the jungle floor: this may be up to about five feet across. A large number of leaves are gathered by the bird and these are placed, usually in a symmetrical arrangement in the cleared space. There may be over one hundred leaves, which the catbird clips from the trees by means of the saw-like notches in its bill. The leaves are invariably turned upside down—whether this is to prevent them from curling or whether it is to show their pale sides, is not known; it may well be both. Over the cleared ring will be a horizontal branch or vine and this is used by the bird as a perch from which to pour forth his remarkable medley of notes including the mimicry of other bird calls. This catbird's own calls include a loud 'cluck-cluck' or a rattle.

The bird sings and calls on and off most of the day outside the breeding season, but during this time the concerts are restricted to dawn and dusk. Native fruits, snails and insects form the bird's diet. A frail stick nest is built, quite unlike those of the other two catbirds. Thin twigs are used with finer ones for a lining. The usual situation for it is in thick foliage at heights up to about eighty feet. Two rich creamy-brown eggs are laid and the breeding season is from November to January.



# PARADISAEIDAE

## Birds of Paradise and Manucode

We have three Birds of Paradise in Australia and a related species called the Manucode. This last bird is a dark glossy, blue-green bird, but it lacks the fine colours and adornments of its nearest relatives.

The stronghold of the Bird of Paradise family, is of course New Guinea and the neighbouring islands. They have not been closely studied on the whole, and some species are known only by a few museum specimens that have been collected, without any accompanying data, by native hunters.

The knowledge of the existence of these birds, however, dates back to before the sixteenth century. Skins were brought into the Orient by Chinese traders and voyagers, and the first seen in Europe were sent to the King of Spain in Magellan's ship *Victoria* in 1522.

It did not seem credible that such unbelievably beautiful creatures could possibly live on the earth and the Spaniards decided that they must be visitors from paradise—Birds of Paradise they have been ever since.

Manucodes, found in New Guinea and Australia, derive their name from the Portuguese word *Manucodia*, which in turn is a corruption of the Malay 'manuq dewata' meaning 'birds of the gods'.

The bulk of skins coming into Europe in the early days were prepared by natives, who removed the legs for ease of skinning. Thus, all kinds of fanciful and charming tales arose about these birds that never alighted. They were said to live entirely on the wing, and fly continually towards the sun. Females laid their aerial eggs in holes on the male bird's back.

Even that great naturalist, Linnaeus, named one bird *Paradisaea apoda*, the footless bird of paradise; but perhaps with a little scientific 'tongue-in-cheek'.

It was not until 1824 that the source of all these beautiful and mysterious skins was discovered to be New Guinea.

In the latter half of the nineteenth century, the demand for the skins for trimming women's hats and other garments was extensive. During the last two decades of the century approximately 50,000 skins a year were being taken out of New Guinea. This means that the horrifying total of something like one million of these beautiful birds were killed—probably rather more, as the export of them was not banned in New Guinea until the 1920's.

By this time it is not surprising that many hitherto common species had become rare. The present and planned deforestation of large tracts of New Guinea for agricultural purposes, is another threat, to what are probably the most extraordinary and beautiful birds on earth.

The variety and great development of the plumes, gorgets, capes, pennants, wire-like quill developments and crests of these birds are well known. Oliver Austin suggests that a biological explanation for these fancy feathers, and the birds' highly developed display behaviour, is one of recognition. Most birds of paradise are highly promiscuous, polygamous creatures, and twenty or so hybrids are known in the wild. Some between, others within genera; as most of these hybrids are sterile they are of no value for species survival. Therefore recognition within each species has very important survival value. This theory is not proven, but seems a likely explanation of such ornamental development.

The four species that we have in Australia are not amongst the most gorgeous, but one in particular is certainly a handsome bird. This is the Prince Albert Rifle-bird found in northern Queensland and also New Guinea. There are

two other rifle-birds decked in shining green and purple-blue, but these lack the plumes of the other bird. I can find two different explanations of the term rifle-bird. One is that the resplendent colours of the group were reminiscent of rifle-regiment uniforms of the British army during the 1820's. The other explanation is that the double whistle call of the birds, sounds like the strike and whine of a ricochetting bullet. The females of all three species lack the bright hues of the male birds.

## BIRDS OF PARADISE

The Prince Albert Rifle-bird, *Ptiloris magnificus*, is restricted to northern Queensland. It ranges down Cape York Peninsula to the Rocky River area. These birds are also found in New Guinea.

This is the most striking of our birds of paradise, because of the plumes it displays on its flanks, and its handsome metallic throat feathers.

The call of this bird, which rings loudly through its jungle and rain-forest habitat, is a vigorous whistle which follows two sharper whistles.

The diet of the species is fruit of different kinds and insects.

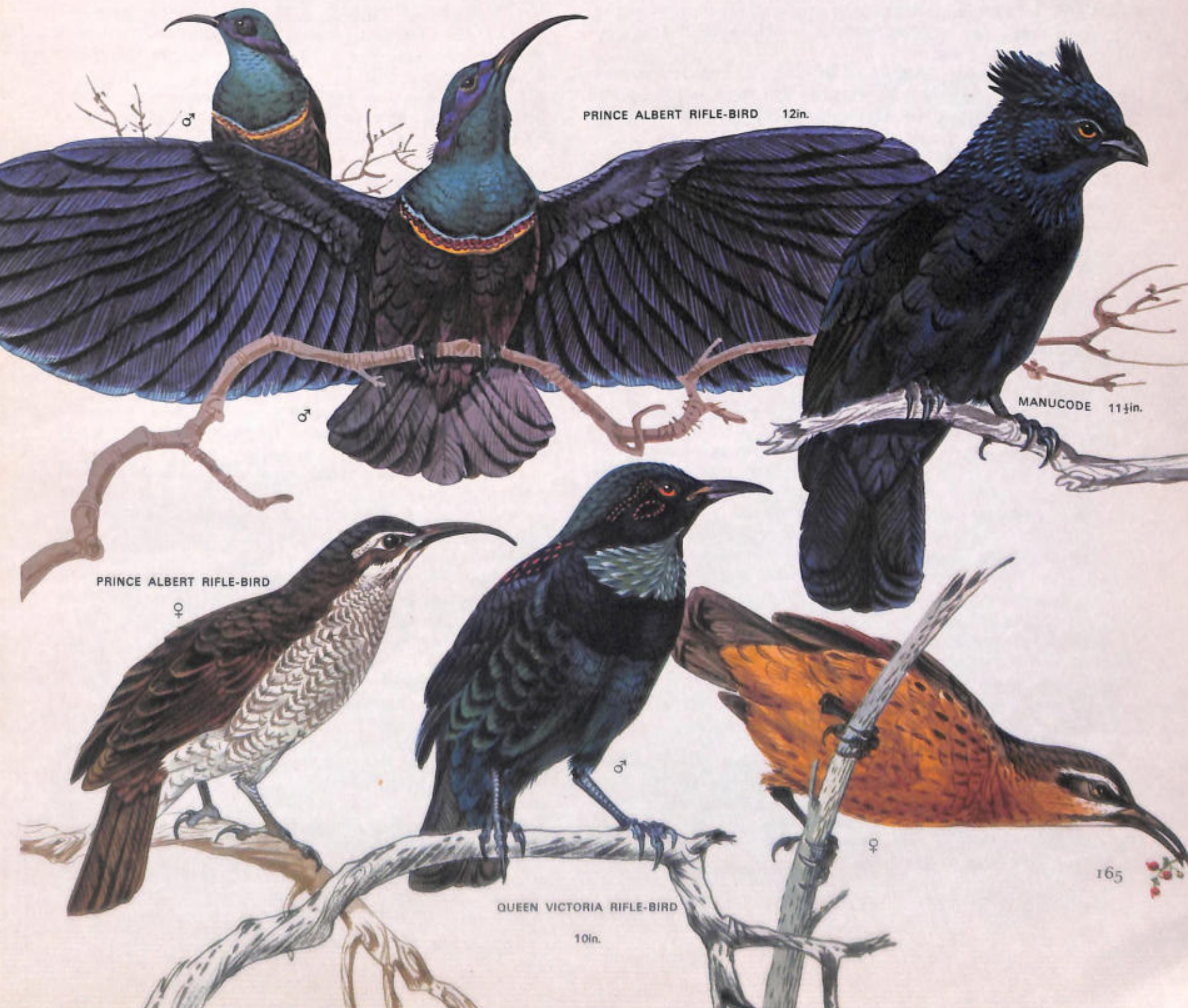
The male rifle-bird has an interesting display which he indulges in before one or more females. At daybreak he begins to call at intervals of a few minutes, after having carefully preened for a quarter of an hour. For a time the bird sits, with wings closed, calling, until suddenly alert, he extends his wings so that the tips meet in front and every flight feather shows separately. This happens as soon as the females approach.

With extended wings and head thrown back to show off the metallic throat feathers in the rising sun, the displaying male sways his body from side to side; the silky feathers descending from his flanks make a considerable swishing sound as he moves.

Occasionally one of the watching females will step along a branch and facing the male, open her wings and sway from side to side, in time with the male bird. She then dashes off and a wild chase ensues through the tree-tops and down the steep gullies.

The nest of the Prince Albert Rifle-bird is an open cup of dead leaves, vine-tendrils and bark-fibres, lined with smaller tendrils and soft plant-fibres. The top of a pandanus palm is quite a common nesting-site, only about seven feet off the ground. On top of a dead, solid tree trunk is another typical spot, and this may be as high as forty feet.

Two creamy-white eggs are laid, handsomely marked



with longitudinal streaks and spots of olive, rufous and slate-grey. The breeding season is from October to February or sometimes later.

The Queen Victoria Rifle-bird, *P. victoriae*, named in honour of Queen Victoria, is found in north-eastern Queensland from the Cooktown district to the Mackay District.

They are birds of the rain-forest and inhabit some islands off the coast as well as the mainland. These rifle-birds are similar in their habits to the foregoing species, and they have a similar diet of native fruits and insects.

The chief call of this species is a harsh 'ya-s-s', which rings loudly through the dense forest.

An open, cup-shaped nest is built of dead leaves, vine-tendrils and rootlets, lined with finer materials. Also there are invariable pieces of sloughed off snake skin woven into and draped around the nest. This species and the Paradise Rifle-bird are the only two Australian birds to consistently use snake skin in their nests. The purpose of this is not clear. A number of theories have been advanced: some people believe that the patterned skin is picked up purely for decoration, others maintain that it is for protection, and that lizards, other snakes, perhaps even predatory birds, may be put off approaching the nest by the waning skin. No unequivocal solution to the problem has been arrived at.

The nest is usually well hidden in a tangled mass of vine or other foliage near the top of a tall tree standing in dense forest. Two flesh-coloured eggs are laid, beautifully marked with longitudinal streaks and spots of reddish and purplish-grey. The breeding season is from October to December and sometimes later.

Paradise Rifle-birds, *P. paradiseus*, have the widest range of any of this group. They are found from the Mackay district in Queensland down as far as the Hunter River in N.S.W.

These handsome birds frequent the forest and big brush country of the coast and coastal ranges. The male has a full, bird of paradise style of display, spreading his wings, throwing back his head and turning this way and that to show off his gleaming metallic hues. He has a special display perch as a rule, which is on the edge of the forest or overlooking a gorge or valley.

The diet of Paradise Rifle-birds is native fruits and insects. The insects it gathers by probing into crevices in trees or lifting the bark. Their call is a loud resounding double screech.

In captivity these birds have been known to kill mice and small birds and eat only the brains; whether they have a similar habit in the wild state is not known.

A shallow bowl-shaped nest is built of dead leaves and vine-tendrils. This is lined with finer stems and twigs and draped with cast-off snake skins in the same manner as the Queen Victoria bird's nest. It is hidden in the thicket of a mass of vines or other deep foliage near the top of a tall tree deep in the forest. Two reddish-cream eggs are laid, beautifully marked with longitudinal streaks and spots of chestnut, purple-red and grey. The breeding season is from October to December.

The Manucode, *Phonygammus keraudreni*, is restricted in Australia to the Cape York Peninsula; it also occurs in New Guinea.

These dark, rather glossy birds, frequent various fruit-bearing trees and may frequently be seen in the company of other fruit eating species.

The most notable thing about this bird is its astonishingly deep voice. It has a fine deep call that has been likened to a deep organ note. It is thought that the timbre is imported to its voice by the long convolutions of the windpipe.

Manucodes are thought to be at least partially migratory, travelling between Queensland and New Guinea.

The male birds have a display during which, they erect their long, shining neck feathers into a wide ruff, and give their deep booming calls.

A rather shallow, open nest of vine-tendrils and plant stems is woven together and usually placed out on the thinner branches of a tree. It may be up to seventy feet or so from the ground. Very often the nest is built in the same tree (or one close by) that contains a Black Butcher-bird's nest. As the butcher-bird is such a pugnacious creature this proximity is no doubt a protection for the Manucode. Two pale purplish-pink eggs form a clutch, and these are marked with longitudinal streaks and spots of chestnut and grey. The breeding season is from October to January.

## CLIMACTERIDAE
Australian Treecreepers

The treecreepers of Australia do not appear to be closely related to the birds, called creepers and treecreepers, found in other parts of the world. The Northern Hemisphere birds really do creep over the boles and limbs of trees, using their stiff, pointed tail feathers as props to aid them in clinging on. Our birds move swiftly and vigorously over the branches, gripping with their long toes and standing up, with their bodies held well away from the bark.

Unlike a sittella, which works in every direction, the treecreeper starts near the bottom of a tree and spirals upwards and perhaps out along a limb. It then flies down to the bole of the next tree and commences another spiralling climb. They may also be distinguished from sittellas by their noticeably curved bill, and their tendency to remain in pairs, rather than flocks, during the non-breeding season.

The treecreepers are often known as 'woodpeckers' in the bush, but are quite unrelated; we do not have any woodpeckers in this country.

### TREECREEPERS

The Brown Treecreeper, *Climacteris picumnus*, is widely distributed from eastern South Australia, up through Victoria and N.S.W. to Queensland. In areas of suitable timber it penetrates to coastal areas.

Usually in pairs, these birds frequent light forest country and partly cleared farm-lands. They may quite frequently be seen feeding upon the ground, perhaps rather more often than any of the other treecreepers. Stumps, fence-posts and trees are also visited in the birds' quest for spiders, insects and grubs.

The call is a high-pitched 'pee-pee-pee' rapidly and repeatedly uttered, particularly if the bird is alarmed. Another note is a loud 'twink' sound. As each tree or post is finished with, the treecreeper flies down to the base of the next and starts working upwards, either straight up or in a spiral. The nest is composed of felt, fur, hair and small feathers, and may be placed in the hollow branch of a tree or in a hole in a fence-post. Nests have also been found in creek-banks.

Three eggs are laid which are a pinkish-white and profusely scattered with small pinkish and purple spots. The breeding season is usually from July to December.

Rufous Treecreepers, *C. rufa*, are confined to south-western Australia. Their range extends from the south-west corner (north to Geraldton and Kalgoorlie) eastwards to the Eyre Peninsula in South Australia.

These birds are usually in pairs and they frequent open forest and other timbered habitats. Like the Brown Treecreeper, they often feed upon the ground, where they hunt for insects of various kinds. They are also arboreal, climbing upwards over the trunks and branches, often in a spiralling movement. These treecreepers have a piercingly loud alarm call, a single note quickly repeated a number of times, which has been syllabised as 'tsoo-tsoo-tsoo'.

The nest is a felt-mass of fur, hair and feathers, and is placed in the hollow of a tree, often the 'spout' of a broken branch. It may be up to twenty feet from the ground but in Western Australia it is recorded as usually being below ten feet. A hollow log lying on the ground may even be used.

Two or three eggs are laid which are white, speckled all over with reddish spots. The breeding season is from September to December.

Unlike the White-throated and the Brown Treecreepers, this species has not taken kindly to encroaching civilization and deforestation for farm-land.

The Black Treecreeper, *C. melanota*, is confined to the north-east, from northern Queensland to the Burdekin River area.

This species was discovered by the naturalist John Gilbert, who collected the type-specimen on the very day of his death. He was speared by the blacks who attacked the Leichhardt expedition in June 1845.

These birds are usually in pairs, and they frequent open forest country. Their habits are similar to those of the other treecreepers. They hunt for insects on the trunks and branches of trees, where they move upwards, often in a spiral before flying down to the bole of the next tree.

The nest is built in a hollow limb of a tree, and is constructed of fur, feathers, wool and other soft materials. Beneath the nest, on the floor of the nesting chamber, pieces of charcoal are often found. Exactly why the birds put them there is not known, but it may be something to do with absorbing the moisture that gathers in the humid climate of the birds' habitat.

Two pinkish-white eggs, profusely speckled with red, are laid. The breeding season is usually from October to December but may sometimes be later.

The White-throated Treecreeper, *C. leucophaea*, is widely distributed and one of the more common of the group. They are found from south-eastern Queensland down through central and coastal N.S.W. to Victoria; these birds also extend into south-eastern South Australia but are rare in Tasmania where they have never been recorded as a breeding species.

They are very vigorous birds, moving rapidly up the trunks and branches of trees in well-timbered country—sometimes in quite dense forest. They are strictly arboreal, unlike some other treecreepers, and climb upwards in the manner typical of the family.

These birds are usually seen in pairs and attention may be drawn to them by their rich, very liquid bubbling notes, heard in the spring and summer. They also have a shrill single note, which may be uttered quickly a number of times.

The nest is built in the hollow of a tree-trunk or in a hollow branch, usually rather high up. The nesting-hole is lined with bark-fibres, wool and other soft material.

Three white eggs are laid which are sparsely marked with reddish and purplish-brown spots. The breeding season is from August to December.

The Little Treecreeper, *C. minor*, has a restricted range, being found only in north-eastern Queensland. They move in pairs, and inhabit the upland rain-forests. They are similar in habits to the White-throated Treecreeper, hunting for insects on the bark of tree-trunks and branches.

The nest is built in some hollow part of a tree, the cavity being lined with green moss and soft bark-fibres.

Two creamy-white eggs with small spots of reddish-brown and pale lilac are laid. The breeding season is from October to December.

The Red-browed Treecreeper, *C. erythrops*, is found in well-timbered country in the coastal and mountain districts. Its range extends from south-eastern Queensland to Victoria.

These active little birds are usually seen in pairs, and are similar in habits to the White-throated Treecreepers, except that they may frequent the lower parts of the trees. They rapidly work their way over tree-trunks and branches in a typical treecreeper manner, always working upwards, and often in a spiral movement.

The call has been described as 'a rapid, high-pitched hissing chatter'. Nesting takes place in the hollow of a tree, usually up to about forty feet from the ground. The nest is a felt of bark-fibres lined with fur.

Two pinkish-white eggs are laid which have small spots

of reddish-brown and dull purple. The breeding season is from August to January.

The White-browed Treecreeper, *C. affinis*, is widely distributed from central Western Australia, through central Australia to south-western Queensland, western N.S.W., north-western Victoria and inland South Australia.

Usually seen in pairs, these birds frequent timber and scrub-covered terrain, including mulga country. They may be seen searching tree-trunks and branches for insects, in the typical treecreeper manner, or hunting for their food amongst fallen timber.

It is a very quiet bird, but the call notes are said to resemble those of the White-throated Treecreeper.

The nest is a felt of fur, grasses, soft bark and plant-down or any other soft material, placed usually at heights up to about thirty feet, in a hollow branch 'spout' or tree-trunk. Three pinkish-white eggs, spotted with pinkish-red and purplish-red, are laid. The breeding season is usually from September to December, but birds have been found breeding as late as May.

Black-tailed Treecreepers, *C. melanura*, are northern birds, found from Derby in Western Australia to north-western Queensland.

These are birds of the river-flats, and in Western Australia are rarely recorded away from the gum-country, and it is interesting that they seem to show a preference for black or burnt trees. Their habits are similar to those of the other members of the genus. A nest of soft bark, fur, grass and similar material, is built in the hollow of a branch or tree-trunk. Two pinkish-white eggs are laid, similar to those of the White-browed bird, but larger. The breeding season is from September to January.

The Allied Treecreeper, *C. wellsi*, appears to be a southern form of the foregoing species, although it is usually given full specific distinction. It is similar in its habits and nesting procedure to the Black-tailed Treecreeper.

They range from mid-western Australia south to about the Gascoyne River.

The breeding season is probably from September to December.

## SITTIDAE

### Nuthatches and Related Birds

In Australia we have no true nuthatches but do have a number of birds which are perhaps best placed in the *Sittidae:* these are the sittellas. Under the classification followed by this book they are placed in a sub-family of the *Sittidae* called the *Neositta*, although some Australian ornithologists consider the similarity to the Northern Hemisphere nuthatches may simply be convergent evolution. They certainly differ in nesting habits. Nuthatches are cavity-nesters, and often plaster up the opening of their nest-hole with clay, leaving a small round entrance; whereas the sittellas build an open cup-shaped nest.

In most cases, the sittellas' nests are marvels of camouflage, being finished off with small strips of bark, often lichen-covered, so that they closely resemble the branch on which they are built.

During the autumn and winter they are gregarious little birds, hunting actively amongst the branches for insects and grubs which they pick off the bark and from crevices in the wood. This gregariousness is carried into the breeding season to some extent: there are records of several birds feeding the one nestful of fledglings. Mixed flocks of these and other small birds of the outer branches and foliage may sometimes be seen. Although well distributed, and not uncommon throughout most timbered areas of Australia,

the sittellas are not found in Tasmania.

All the sittellas are rather similar in size and habits but may be distinguished from each other largely by distribution, there being little overlap between the range of the birds. Head-colour, wing-bar colour and the markings on the undersides are also useful field characteristics for identification.

These birds are also somewhat similar to the preceding group (the treecreepers), in that they creep about the tree-trunks and branches; but they differ noticeably in the bill-shape and have a much more 'mousy' air about them than the bolder, more vigorously moving treecreepers. A more certain difference in their behaviour is that while the treecreepers work from the base of a tree in an upward spiral, the sittellas work in all directions, much more erratically, and may often be seen head-downwards.

## SITTELLAS

The Orange-winged Sittella, *Neositta chrysoptera*, is found from the extreme south-east of Queensland, through N.S.W. to Victoria excepting the far-western portion.

In pairs in the breeding season, or in small flocks at other times of the year, these birds frequent open forest and other well-timbered country.

These sittellas are very active little birds and they run in all directions over the trunks and branches of trees, with a preference perhaps for the higher limbs and branches. They seem equally at home creeping along the undersides of the branches or even working head-downwards as they probe into crevices or beneath the strips of bark. Insects and grubs form the diet of these birds.

Whilst feeding, and as they fly from tree to tree, they keep up an almost constant twittering. In flight the orange-tan patch on the wings is very noticeable.

The nest is a neatly built cup of plant-fibres, soft bark and spider-webs. On the outside the nest is 'shingled' with overlapping strips of bark, which usually closely resemble the adjoining live bark. The usual site is the upright fork of a branch at any height from about five to fifty or sixty feet above the ground.

The eggs vary considerably but a typical clutch would be a greyish-white colour with dark olive and grey markings. Three eggs are laid and the breeding season is from August to January.

The Black-capped Sittella, *N. pileata*, is found from the Pilbara district in Western Australia, through southern and Central Australia to Alice Springs, and further eastwards to western N.S.W. and western Victoria. This species is probably the commonest and most widespread of the group.

These sittellas are similar in habits to the Orange-winged Sittellas. They creep quickly, but rather mousily, over the branches to the trunk, as a rule. In pairs whilst nesting, or in small flocks at other times, they frequent all kinds of timbered country.

Apparently quite unaffected by any discomfort, they readily hang upside-down or head-downwards in their search for insects on and under the bark. The plain underparts and black cap (a whole black head in the female) should serve to distinguish this bird in the field from the preceding species; it also has an orange wing-patch. As they feed, and move from tree to tree, a constant conversational twittering is kept up. In some areas they have been known to visit the suburbs in their winter flocks.

The nest is a beautifully decorated and well disguised open cup. It is built of bark-fibres and other fine materials, matted together with spider-web. Overlapping shingles of bark, often neatly cut into regular shapes, are attached to the outside of the nest, making it most inconspicuous.

The eggs are similar to those of the Orange-winged Sittella, and the breeding season is from August to December.

Striated Sittellas, *N. striata*, are confined to north-eastern Queensland, from Cape York to Inkerman.

In pairs or, in small flocks, both in and out of the breeding season, these birds are found in timbered country throughout their range. They have the reputation for being the most active of the sittellas, as they hunt for spiders, insects and grubs in the bark of trees.

Striated Sittellas are similar in their habits to the other *Neositta*, working rapidly about the branches, probing into crevices and under bark with their sharp bills. They work erratically in all directions and frequently progress head-downwards.

The nest is similar to those of its relatives; a small neat cup of bark-fibres and other soft materials. This is carefully camouflaged with small 'shingles' of bark.

As the small flocks of these sittellas feed and move through the timber they continuously call in twittering notes, and as they fly, a whitish wing-patch is noticeable.

Three white eggs, with slate-coloured markings, are laid. The breeding season is from August to December.

The White-headed Sittella, *N. leucocephala*, is another species restricted in its range, being found only in eastern Australia, from Mackay to north-eastern N.S.W.

Similar in habits to the other sittellas, they are frequenters of open forest and other timbered country, favouring paperbark ti-trees in particular.

They feed on spiders, insects and grubs which are picked from the bark of trees or from crevices in the branches. As with other sittellas, they seem to prefer the branches to the trunks as hunting-grounds.

A frequent, twittering call is kept up as the small flocks feed and move from tree to tree, and as they fly a yellowish patch shows in the wings. The nest is a well camouflaged construction, similar to those of other sittellas, and it may often be found in a paperbark ti-tree.

Three pale, greyish-white eggs are laid which have sepia and slate markings. The breeding season is from September to December.

The Pied Sittella, *N. albata*, is even more restricted than the preceding species, being found only in the Bowen district of Queensland. It is similar in its habits to the other sittellas. This bird closely resembles the White-headed Sittella except that it has a white wing-patch, rather than a yellowish one.

The nest, eggs and breeding season are also similar to those of the White-headed Sittella.

White-winged Sittellas, *N. leucoptera*, are a northern-Australian species, found from Broome (W.A.) across to the Atherton Tableland (Qld.) and probably beyond, to the Great Dividing Range. They also range south to Alice Springs.

Their habits are typically *Neositta*, as they hunt along the branches, digging under the bark and pecking into crevices in search of insects and other small fry. Like most sittellas, they tend to favour the outer branches of trees. They move about the country in small flocks, except in the breeding season.

The nest is similar to those of the other sittellas, being a neat cup of bark-fibres and other soft materials. The outside of the nest is 'shingled' with small pieces of bark which usually disguise it as part of the bark of the tree in which the nest is built.

Three eggs are laid which are a similar colour to the eggs of the Orange-winged Sittella, but they are much smaller. The breeding season is usually from August to December, but this may vary with the coming of rain, when the bird's range extends to the dry interior.

## TIMALIIDAE

Babblers, Quail-Thrushes and Logrunners

As a world-wide group, this family is a most disparate, and in many ways a taxonomically unsatisfactory one. It contains two hundred and eighty species, ranging from wren-sized birds up to small crows. They vary greatly in habits and may act and look like titmice, thrushes, pittas, or crows. Their nesting habits are also very diverse, some nesting on the ground, some building cup-shaped nests and others making domed constructions.

Two characteristics which members of this ill-defined family do have in common, are a tendency to have soft fluffy plumage and comparatively large, strong legs and feet.

The *Timaliidae* are represented in Australia by twelve species, divided amongst three genera. The best-known of these are the Babblers of which we have four or five species, a new one having recently been discovered in south-western Queensland by a British Museum expedition: there is also divided opinion about whether or not the western form of the Grey-crowned Babbler (sometimes called the Red-breasted Babbler) should be given full specific status.

These garrulous birds move about the country in small flocks, dividing their time between hunting for insects through the trees and foraging upon the ground.

There are five species of quail-thrushes also. These are handsome ground-dwelling birds that are found in a variety of habitats, from the Nullarbor Plain to forest and heathy uplands. They nest and feed on the ground, but will

RED-WHISKERED BULBUL 7¼in.

occasionally perch, on branches when flushed, and more habitually at dawn.

The two logrunners are birds of the scrub-filled gullies in mountainous country and other densely covered habitats. They are noisy birds, with a variety of calls and a pleasant song, and are more frequently heard than seen.

## BABBLERS

The Grey-crowned Babbler, *Pomatostomus temporalis*, is a widely distributed, common, and well-known bird. The familiarity of country people with this bird is suggested by the list of unofficial names the bird has, such as: Apostle-bird, Chatterer, Cackler, Catbird, Codlin-moth-eater, Arco, Happy Family Bird and Hopper being some of them.

The range of this bird is from Cape York down through eastern and south-eastern Australia to eastern South Australia.

They are usually seen in small flocks of up to a dozen or so, moving through scrub-land, open forest or belts of timber in farming country. These babblers suit their name well, as they are very noisy and active birds. They spend a good deal of their time feeding on the ground where they forage for insects, and no doubt they are beneficial to man.

With their wide variety of weird cackling notes and playful gymnastic habits, these babblers are entertaining creatures, and are well thought of by most people in the bush. Many of the calls are difficult to describe but the loud 'arco' or 'ya-ho' is unmistakeable once heard.

A large, untidy, dome-shaped nest is constructed of sticks and twigs. The entrance is a loose spout or tunnel leading into the well-lined nest-chamber. Bark-fibres, wool, grass or any other soft materials may be used for lining the nest. Old nests are sometimes used in subsequent seasons, being repaired and added to, so that they can become surprisingly large for such relatively small birds. Usually these babblers will nest close together (although I have found solitary nests), and sometimes even in the same tree.

The flock joins noisily in the building, with a number of birds working on the one nest. At night they roost in the nests, several birds crowding into one shelter. Once the eggs are laid, however, the babblers become much quieter, and are seldom observed near their nesting trees. The eggs will frequently be covered over with nest-lining if the sitting bird leaves at its leisure.

The nest is built into the upright forks of a tree, usually only about twenty feet or so from the ground. Three to six eggs are laid which are pale brown to purplish-brown or buff: these are well covered with hair-like markings of darker brown. The breeding season is from August to December.

The Grey-crowned Babbler is not a wandering species, and a flock will frequent one small patch of scrub or line of timber for a number of years; both in and out of the breeding season.

The Red-breasted Babbler, *P. rubeculus*, appears to be but a central-western Australian form of the Grey-crowned Babbler rather than a full species. It is considerably more reddish on the underparts than *temporalis* but is similar in habits and life history.

The nest is a typical untidy, babbler construction of sticks, with an entrance spout, and lined with various soft materials. In the west the birds have sometimes been observed to change the lining of their nests after heavy rain, the loose roof of sticks affording little protection. It may be that the same thing takes place with other species of babblers.

The eggs of *rubeculus* are similar in colour to those of *temporalis*, but smaller.

The breeding season is from August to January as a rule, but eggs have been recorded in June and April. When the young birds hatch, the community spirit takes over again and a number of adult birds will queue up in front of the nest to feed the fledglings: a habit also possibly indulged in by other babblers.

White-browed Babblers, *P. superciliosus*, are widely distributed through the inland areas of south-western Australia, central Australia, South Australia, southern Queensland, western N.S.W. and central and western Victoria.

They are gregarious birds and live in small flocks or family parties as a rule. Their chief habitats are scrub, open forest and belts of timber left standing on farm-land.

Their harsh, animated chattering is a well-known sound in many country districts, and like the other babblers, they are usually a welcome species. Much of the time these birds may be seen foraging on the ground, where they destroy many injurious insects.

The nest is a bulky, untidy structure of twigs and small branches, with an entrance spout of longer twigs. The nest-chamber is lined with soft materials such as wool, bark-fibres or grass. Nests are built into the upright forks of a tree, at heights from ten or twelve feet up to about twenty feet.

Three to five eggs are laid, and these are various shades of pale brown, covered with hair-like markings of darker brown. The breeding season is from July to December.

The Chestnut-crowned Babbler, *P. ruficeps*, is a bird of the interior, found from southern Queensland to western N.S.W., north-western Victoria and eastern South Australia.

These birds are similar in habits and ecology to the other babblers, but are considered to be shyer birds. They live in small flocks and are as garrulous as the rest of the genus, with a variety of clucking notes and other harsh

CINNAMON QUAIL-THRUSH 8¾in.

cries. Insects, mainly procured on the ground, form the diet of these birds.

The nest is similar to those of other babblers: a domed, stick construction, loosely put together, with a tunnel entrance in one side.

Four or five light stone-coloured eggs are laid which have hair-like markings of sepia, or blackish-brown. The breeding season is from July to December.

In May 1963 a British Museum field-party discovered a new babbler, which has been named *Pomatostomus halli*. It is known by the common name of White-throated Babbler or Hall's Babbler, in honour of H. W. Hall, who financed the expedition.

The bird was discovered, and the type specimen collected, near Langlo Crossing in south-western Queensland; the extent of its range has not yet been entirely established, although Sydney Museum ornithologists have recently discovered more about its distribution.

This species generally resembles the White-browed Babbler but is broadly white on the throat and dark brown on the rest of the underparts. Its general habits will no doubt prove to be much the same as the other babblers.

## QUAIL-THRUSHES

The Nullarbor Quail-thrush, *Cinclosoma alisteri*, is found only on the Nullarbor Plain in eastern Western Australia and south-western South Australia.

This is a shy bird and it is possible to travel extensively in its territory without seeing one. The bird shelters under the low scrubby bushes and is hard to flush. If it is put to flight, it goes off on whirring wings, rather reminiscent of a quail, but only flies a short distance before dropping back to cover. The diet of this quail-thrush consists of various insects.

The nest is usually under the cover of a dead bush or other shelter and is a grass-lined scrape on the ground. Three dull creamy-white eggs are laid which have a faint greenish tinge and olive-brown and slate markings. October is the only month recorded for the nesting of these birds.

Cinnamon Quail-thrushes, *C. cinnamomeum*, are fairly widely distributed, being found from the north-east of South Australia (extending west to the Gawler Range and the Musgrave Ranges) to the southern Northern Territory and across to north-western N.S.W.

This species is found in very dry stony outback country where it is hard to imagine that anything but a few lizards could live. The rusty-browns of its plumage blend remarkably well with its surroundings and, unless the bird moves, it is easily overlooked.

During the cool, early morning hours, these quail-thrushes are quite active, hunting over open terrain for insects of various kinds. As the day becomes hotter they seek the shelter of the low vegetation and do not emerge until evening.

At sunrise, or soon after, the male bird hops up on to some favourite perch, a dead branch or a rock, and gives a performance of his plaintive and rather monotonous call. This call has been syllabised as 'i-i-i-i-eeee'; the drawn-out second part being half a note higher. This call is repeated for some time and a number of birds may answer each other.

An open cup-shaped nest of grass and a few twigs is built, usually in the shelter of a low bush. Two greyish-white to brown-grey eggs, marked with streaks of amber over blue-grey, are laid. The breeding season is usually in March and April.

The Chestnut Quail-thrush, *C. castanotum*, is found from south-western N.S.W. to north-western Victoria, South Australia and south-western Australia, except for the extreme south-west corner. In pairs, or in small family parties, these handsome birds may be seen in open forest, mulga or mallee country. They are terrestrial birds seeking their food, which is insects of various kinds, upon the ground.

If flushed, these quail-thrushes take off on whirring wings, but will fly only a short distance before dropping back into cover. The call is a low piping whistle, usually uttered as the birds run away from an intruder, or frequently at dawn when they call from a high perch.

The nest is a slight depression in the ground, loosely

lined with strips of bark and dead leaves. It is usually placed under the shelter of a dead bush or any other low growth.

Two greyish-white eggs are laid which have brown and lavender markings. The breeding season is from August to December.

The Chestnut-breasted Quail-thrush, *C. castaneothorax*, is distributed through central and south-western Queensland and the adjoining parts of N.S.W., and is also found in central and mid-western Australia.

This species is not common and has rarely been observed. Very little is known of its habits or life-history. Its usual haunt appears to be belts of scrubby timber.

Like the other quail-thrushes, this bird flies only a short distance if flushed, before diving back into cover. It is then very hard to find and is seldom flushed a second time.

The nest has not been recorded but an egg, claimed to be of this species, is described as a dull white, thickly spotted with blackish-brown. The breeding season is not known.

The Spotted Quail-thrush, *C. punctatum*, is the most widely distributed of this genus. Their range extends from south-eastern Queensland down the eastern states to Tasmania. They also extend westwards to the vicinity of Adelaide.

These birds inhabit forest country. Almost always in pairs, these shy birds spend almost all their time upon the ground, preferring to run and hide rather than fly. Should one be put up, it flies off with a startling whirr of wings. After a short distance the bird will land, sometimes in a branch, to look around. More frequently it will dive back into thick cover and run off.

It is said that a pair of birds communicate with each other by means of a low whistle; should they become separated each whistles until re-united.

The food of these quail-thrushes is seeds and insects of various kinds.

A slight depression in the ground serves as a nest; this is lined with strips of bark, leaves and grass. It is usually built in some sheltered position such as beside a boulder, or under a low bush or tussock. Observations suggest that after the young have hatched, they return to roost in the nest for two nights or so.

Two, or sometimes three, eggs are laid; these are well marked with dark brown and lavender, and the breeding season is from August to February.

## LOGRUNNERS

The last two Australian representatives of this group are the logrunners; ground-frequenting birds of the dense brush.

The Black-headed Logrunner, *Orthonyx spaldingi*, is found in north-eastern Queensland, from the Cooktown district to Cardwell.

These birds inhabit the dense scrub of the mountain ranges and gullies. They are usually in small groups, and are very noisy birds, far more often heard than seen. The call is a rich, 'shouting' 'chow-chilla chow-chow, chowy chook-chook', and indeed the bird is often called the 'chowchilla'. There are also reports of this species mimicking other birds.

As the name suggests, these logrunners spend their time upon the ground where they hunt for insects on the forest floor and in the forest debris. They scratch vigorously at the fallen leaves and twigs in a manner reminiscent of the domestic fowl or the lyrebird.

A domed nest is made, constructed rather loosely of twigs and leaves. Moss is built into the nest and also used as an inner nest. It may be placed on the ground or almost anywhere near the ground: between the roots of a tree, in a thicket of vines or other herbage, or on a stump.

These birds probably breed at various times of the year, depending on conditions, but the main season appears to be the winter and autumn months; that is to say, the dry season, in northern Queensland.

One white egg is laid and it is probable that the female alone builds the nest and incubates the egg.

The Spine-tailed Logrunner, *O. temmincki*, is a more southern species than the foregoing bird. Its range is from south-eastern Queensland to eastern N.S.W. in the Wyong district. There is also a re-appearance of the bird further south in the Illawarra district.

Dense scrub and jungles are the habitats of this species, where it hunts for its food in the clearings. The logrunners scratch vigorously about in the deep humus and fallen leaves in search of grubs, woodlice, beetles and other insects.

As it feeds, the logrunner spreads and depresses its tail so that the pointed ends rest upon the ground as a prop, whilst the bird scratches, first with one foot and then the other. The top layer of debris having been flung away, the exposed damp earth is then searched for food. It was thought that this bird used its tail to sweep aside the leaves, but apparently this is not so. Closer observation has shown that any sideways movement is only caused by the bird changing from one leg to the other as it scratches.

These logrunners sometimes gather together in small numbers and give group 'singing' performances. Each bird hops up and down the fallen tree-trunks, drooping its wings and fanning its tail. With its head in the air, throat distended and bill open, the bird loudly calls 'be-kweek, -kweek, -kweek-kweek' in concert with its companions.

A roughly globular nest is built, on or near the ground, in the shelter of ferns or grass or between the roots of a tree. The building is undertaken entirely by the female. She first constructs a concave platform of twigs and dead leaves; into this is built a compact layer of decayed wood to which a lining is added. The lining is made up of thin rootlets, and other fine vegetable-matter. A cowl of thick green moss is built up over this, making a domed nest with an entrance hole at the front. Built out from below the entrance is a strange platform of twigs, which some observers claim is to clean the birds' feet before they enter the nest.

Breeding birds have been recorded at most times of the year, although the main nesting season seems to be during autumn and winter. Two white eggs are laid.

## PYCNONOTIDAE

### Bulbuls

Many of the one hundred and nineteen species of Bulbuls are common and familiar birds throughout their natural range, which is Southern Asia and Africa. They have adapted readily to cultivated lands and town life, probably increasing with the encroachment of man on their haunts.

### BULBULS

We have no indigenous members of the family in Australia, but one species, the Red-whiskered Bulbul, *Pycnonotus jocosus*, has been introduced into this country.

These birds are supposed to have been released in the Sydney district in the 1880's, although it took about thirty years for them to become firmly established, perhaps to some extent through later releases and escaped cage-birds.

These bulbuls are now thriving, throughout most Sydney suburbs and are spreading to bush areas in some places. They are lively and colourful birds, but regarded as something of a pest because of their depredations in gardens and amongst soft-fruit trees.

There is a small number of Red-whiskered Bulbuls in Melbourne, apparently a quite separate population as none occur between the two cities of Melbourne and Sydney. Additionally, observers in Adelaide have reported its presence there.

The nest is cup-shaped, made of bark-strips, grass and rootlets and often incorporating an old piece of paper or a few dead leaves as a foundation. It is lined with finer rootlets and usually concealed in a thick bush only about ten feet from the ground.

From two to four glossy white eggs are laid which are well spotted, and sometimes blotched, with reddish-brown. The breeding season is from September to February.

## TURDIDAE

### Thrushes

This very large family of birds, famous for their fine singing, is very widely spread throughout the world. They are absent only from the Antarctic, some Polynesian islands and from New Zealand (although the introduced English Blackbird and Song Thrush are in New Zealand).

There are about three hundred and six species assigned to the thrush family according to some current views. Some ornithologists align the local thrushes with the Whistlers—the *Pachycephalidae*—but to follow the classification system used in this book our thrushes have been left in *Turdidae*.

We have two introduced species of the nominate genus *Turdus*, these are the English Blackbird and Song Thrush. Most of our other thrushes, or shrike-thrushes, as they are also termed, are in the genus *Colluricincla* which contains seven species, and there is one more, the Ground-thrush, in the related genus *Oreocincla*.

### THRUSHES

No doubt the best-known of our native shrike-thrushes is the Grey Thrush, *Colluricincla harmonica*, which is distributed throughout much of eastern and south-eastern Australia, from Cape York to the Spencer Gulf in South Australia. It is also found on Kangaroo Island and Tasmania.

The Grey Thrush was one of the first Australian singing birds (passerines) to be recorded and figured. In White's *Journal of a Voyage to New South Wales*, published in 1790, there is an account and an interesting plate of the 'Port Jackson Thrush'.

These birds are found in a variety of habitats, and they seem as much at home in heavily timbered wet country as in the drier mallee and she-oak areas.

They are highly-esteemed birds, and famous for their beautiful notes. Grey Thrushes come into full song in the spring and summer months, although there are records of the birds being quite vociferous at other times. In the early spring, the development of this thrush's song can be traced, from a tentative piping, which grows with the advancing season, into a variety of rich whistling calls.

The bird is somewhat unusual in that it sometimes sings whilst feeding or searching on the ground for its insect-food. It will also call loudly immediately after a gunshot; a habit it shares with the Rufous Whistler.

Grey Thrushes become quite confiding, if living near humans, and will nest in close proximity to buildings, although in the bush they are not a bold species. Banding has shown that the birds are stationary, remaining close to their territory the year round, while others wander further afield in the cooler months. In some parts, the appearance of this bird in the suburban gardens is considered to indicate the coming of inclement weather (Sharland).

They are to a large degree quite useful birds, consuming many insects; they are also particularly fond of spiders. Another, less endearing and less well-known habit, is their nest-robbing. Grey Thrushes quite frequently take the eggs of other birds and they will also eat nestlings.

The nest is a rather bulky cup of bark, roots, grass and dead leaves. It may be found in a variety of sites; the hollow of a broken-off limb, the top of a stump, in the upright fork of a tree, or sometimes hidden in herbage on the ground. Around dwelling places it will nest under verandahs or in any other suitable nook. Hollows in creek-banks also provide nesting-sites and even the disused home of a Mudlark may be used.

Three or four creamy-white eggs are laid which are marked with olive-brown and grey. The breeding season is from August to December in the south, and the species often raises a second brood.



The Western Thrush, *C. rufiventris*, is a similar bird to the foregoing species, and is its western counterpart. It is generally distributed in the west reaching north to the Fortescue River. Eastwards its range extends to the Eyre Peninsula and the bird is also found in Central Australia.

The Western Thrush has not adjusted to the inroads of humans like the eastern bird, consequently it has gone from many of its old haunts, and is seldom seen in the vicinity of Perth. It has a loud and cheerful song which is considered to be only slightly inferior to that of its eastern relative.

The nest is a cup-shaped structure of bark and other plant-fibres, lined with finer material of the same kind. It may be built in a clump of thick foliage or in the broken end of a limb, and often at considerable heights from the ground. In areas where babblers' old nests abound (and often there is a number within a small area), this thrush will often utilize one of the disused stick-nests.

From two to four eggs are laid which are white with brownish and grey markings. The breeding times of this bird vary; the season may be from September to November or in March or April.

The Brown Thrush, *C. brunnea*, is found in northern Australia from Roebuck Bay in the west to the Leichhardt River district in Queensland.

It is said to be similar in habits to the Grey Thrush but I have found few published observations of this bird. The Brown Thrush usually frequents forest country; the bird is seldom found in the type of dry, small-scrub country, which the Grey Thrush sometimes frequents.

They hop in a sprightly manner over the ground, procuring some of their food; they are also highly arboreal. Their diet consists of insects and other small creatures found on the ground.

The nest is an open cup of strips of bark and leaves, and is somewhat unusual in that it is also lined with leaves. The usual site is on, or in, an old stump or in the hollow of a rock-face.

Three or four eggs are laid which are white, spotted with light olive-brown and slate-grey. The breeding season is from September to November.

The Little Thrush, *C. parvula*, is confined to north-western Australia, from the Admiralty Gulf to Arnhem Land.

This is a species which inhabits brush-thickets and sometimes mangroves, and it favours the dense growth along creeks and rivers. The bird is generally seen on or near the ground where it procures most of its food. The diet is principally *coleoptera* but also other insects of various kinds.

This species has a fine thrush-like song, very clear, loud and melodious. A great colour variation is noticeable in specimens of this bird from various localities.

The nest is a cup of bark strips and usually built into the hollow of a tree-trunk or broken stump. Two or three eggs are laid which have spots of olive-brown and dull grey. The breeding season is usually from November to January.

The Sandstone Thrush, *C. woodwardi*, is found in the north-west of the continent and the Northern Territory, from Napier Broom Bay to the McArthur River.

This handsome bird haunts open sandstone terrain and other rocky country. Little has been observed of its habits, and it is extremely shy and difficult to approach. All the observer sees as a rule, is a glimpse or two of the bird as it flies or hops from rock to rock. It will be exposed for a moment on some promontory, before diving into the shelter of a crevice or overhanging rock. They may also be seen climbing vertical rock-faces in the manner of a treecreeper.

It has the strong and melodious voice typical of the shrike-thrushes. The food of this species is insects and other small fry, all obtained upon the ground and from rock-faces. Their strong and melodious calls ring and echo through the

sandstone gorges in a most dramatic and stirring manner.

The nest is made of the fine, reddish roots of spinifex and is built into holes or on ledges of the large overhanging sandstone rocks. Two or three creamy-white eggs are laid, with brown, black and grey markings. The breeding season is from about December.

The Rufous Thrush, *C. megarhyncha*, is fairly well distributed in eastern Australia from Cape York to the Hastings River district in N.S.W. This bird also occurs in New Guinea.

Gould was familiar with the Rufous Thrush, finding them 'tolerably common' in the thick brushes skirting the lower Clarence and Richmond Rivers where, no doubt, they are still as plentiful. These birds prefer to remain in thick growth, and they will seldom be seen in more open country. They spend considerable time upon the ground as is typical of the other thrushes, although some observers have stated otherwise. They may often be heard scratching about in the dead leaves and other debris, before they are seen. Most of their food is found in the trees, and they may be observed hopping along the thick limbs in search of insects and spiders.

Like its relatives, the Rufous Thrush has a rich variety of notes. One of its chief calls has been described as 'tu-whee, wot-wot', and it will also give a more sustained song at times and occasionally mimic other birds.

The nest is a cup of dead leaves, strips of soft bark and rootlets, and lined with finer material. It is usually well concealed in a tangle of vines or in a thick bush.

Two or three pinkish-white eggs are laid which have reddish and purple-grey markings. The breeding season is from September to January.

The Stripe-breasted Thrush, *C. boweri*, is found in the highlands of north-eastern Queensland. This bird's chief haunts are in the Bellenden Ker Range. It is a true mountain bird, being found in heavy rain-forests and never in any of the low river-scrub areas.

This is not a particularly shy species, and is reported to quite readily fly down to pick up an insect from near a person's feet. Very little has been recorded of the habits of this handsome bird, however. The song is loud and rich in the typical shrike-thrush manner. The birds feed on insects.

A cup-shaped nest is built, of leaves, bark and plant stems and lined with finer material such as rootlets. It is usually well concealed in a thicket of lawyer-vines or other dense foliage at heights up to about twenty-five feet.

The clutch is two or three pinkish or creamy-white eggs. These are marked with dark olive, or reddish-brown and grey. The breeding season is October to December.

The Ground-thrush, *Oreocincla lunulata*, is placed in a different genus, and certainly looks quite different from the *Colluricincla* group.

These birds are found from northern and north-eastern Queensland to Victoria and westwards as far as Adelaide. They also inhabit Kangaroo Island, Tasmania, and some of the Bass Straits islands.

They appear to be a resident species on the whole, although some birds may be more nomadic outside the breeding season. They tend to be found in the coastal districts and the seaward-facing ranges, but in a few places they have penetrated west of the Great Dividing Range and also into some dry forests of central Victoria.

They may be seen, hopping quietly about in the undergrowth, turning over leaves as they go, and stopping, with head cocked as they watch or listen for insects. Worms, snails, grubs and anything of a similar nature are also eaten.

Ground-thrushes are retiring, but are not particularly shy birds. If disturbed, they will often freeze, allowing one to walk past within a few feet, suggesting that they rely on their protective colouring to escape notice.

A single high-pitched whistle will occasionally be heard from this bird, and even more rarely, one might hear it sing a glorious blackbird-like song. Dawn and dusk are the times when its very beautiful voice is most likely to be heard.

A fairly bulky cup-shaped nest is built, usually of bark strips and a few leaves, and lined with grass and rootlets. On the outside, the bird covers the nest with thick green moss. Sometimes an old nest or the nest of a possum is used as a foundation.

The forked branch of a tree is a favourite site, but it may also be built on an old stump, on a rock ledge or creek-bank, or in a mass of foliage.

Nesting commences in the winter, from late June on the average; sometimes even earlier in Tasmania and rather later, further north in Australia. The female does most, or perhaps all of the brooding.

Two or three bluish-grey, pale blue, greenish, buff or stone-coloured eggs are laid. These various background colours will be marked with reddish-brown freckles and blotches.

## SCRUB-ROBINS

The two scrub-robins are included with the thrushes in the *Turdidae* by some taxonomists, and in the *Timaliidae* by other ornithologists, along with similarly terrestrial birds. Their *field* characteristics suggest that they are related to the *Turdidae*.

The Southern Scrub-robin, *Drymodes brunneopygia*, is distributed from south-western N.S.W. to north-western Victoria and southern South Australia. There is also a population in the south-west corner of the continent, extend-

ing north to the Shark Bay area. It appears likely that its northern limits in the west are related to the mulga-eucalpyt line.

This bird was one of several new species discovered by Gould in 1839. He collected his type specimen in the mallee scrub east of Adelaide. This habitat is typical as the bird is normally found in scrub-country such as mallee, mulga and pine.

They are usually quiet and rather shy, although some observers have found them otherwise. They may be called up easily by squeaking at them and with care they may be approached quite closely. They appear to be territory-conscious and are rather local in their movements.

Although terrestrial by habit, they fly quite well, but prefer to hop away from an intruder. Glimpses may be caught of this lively-looking brownish bird, hopping off into the scrub, flicking its wings and slowly raising and lowering its tail.

Insects of any kind form the basis of this bird's diet and seeds are also eaten. The scrub-robin hunts amongst the dead leaves for food, and tosses them aside with its bill in a rather thrush-like manner, and will now and then fly up a foot or two to capture a passing insect.

The song is a melodious whistle syllabised as 'chip-chip-o-wee'. The bird often perches on a branch to sing, especially for its morning song. The alarm note is a high-pitched whistle or a hiss.

The nest is made by the female, who starts it off by scraping a hollow in the ground, and shaping it by revolving her body in the depression. A border, or almost a wall, of dead sticks is built around the hollow; this construction may contain a hundred or so fair-sized sticks. The actual nest-hollow is lined with grass, rootlets or fine twigs. The site is hidden under the cover of low vegetation, or occasionally just off the ground on a low stump or in a thicket.

One egg is the usual clutch, and it is a greenish-grey colour, thickly speckled with browns. The breeding season is from July to January.

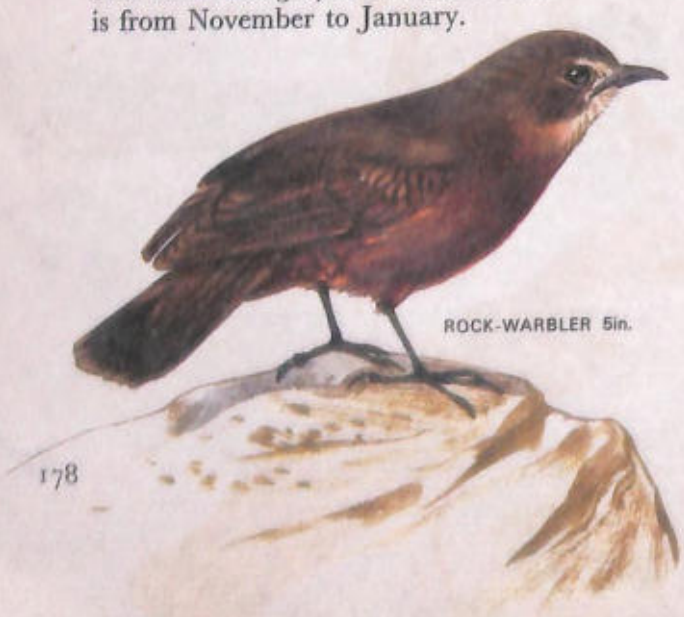
The Northern Scrub-robin, *D. superciliaris*, is found in the Roper River area and north-eastern Queensland from the Atherton Tableland to Cape York.

An inhabitant of much thicker and more luxuriant scrub than the former species, this bird is otherwise rather similar in its habits. It moves quietly about on the ground, sifting through fallen leaves and other debris, in search of insects of various kinds.

The call-note is a high-pitched whistle, to which the bird will answer quite readily if it is imitated.

A circular scrape is made in the ground for a nest and this is then lined with vine-tendrils, leaves and plant-fibres. The usual site is at the foot of a tree.

Two dull white or stone-grey eggs, speckled with browns over faint blue-grey markings, are laid. The breeding season is from November to January.



# SYLVIIDAE
## Old World Warblers

The *Sylviidae* comprise the Old World Warblers. There are about three hundred and ninety-eight species in various parts of the world, gathered under this heading. As Oliver Austin says in *Birds of the World*, 'the family *Sylviidae* is something of a catchall'. His classification (followed in this work) which is based on that of Alexander Wetmore, divides the family into four sub-families—the *Sylviinae* or true warblers, the *Polioptilinae*, or gnatcatchers, the *Regulinae*, or kinglets and ' . . . the aberrant *Malurinae*, or Australian warblers, limited to Australia, New Zealand and the East Indies'.

In Australia we have representatives of only the first, and of course, the last, sub-families. The *Sylviinae* is by far the largest of the four sub-families, although it is but poorly represented in Australia. We have eight species in this group divided amongst five genera.

In the remaining sub-family we have the large number of eighty or so species lumped together. The verb 'lumped' is used advisedly, as the *Malurinae* are considered to be the most unsatisfactory section of Australian bird classification.

The relationships between the various members of this disparate assemblage are not at all clear, but it is generally accepted that it is an unnatural grouping of superficially similar species. Until further knowledge is obtained about them, nothing useful is gained by trying to force them into arbitrary divisions. In the treatment that follows therefore, they have been maintained as one sub-family (following Wetmore), and treated as a heterogeneous collection of genera, with the nominate genus at the top of the list.

In the breeding season the male birds assume a very much darker plumage (quite blackish on the throat and breast), than during the remainder of the year. The male is considerably larger than the female, being up to three inches longer. The difference in size between the sexes, in this bird and the Rufous Songlark, is unique amongst Australian passerine birds. The species also appears to be polygamous (Cayley).

The nest is built of grasses, and is in a scrape or hollow in the ground, usually sheltered by a tussock, or a small bush. Three or four salmon-pink eggs are laid which are speckled all over with darker pinkish-red, particularly at the larger end.

The breeding season is from about August to December in the western parts of the continent and from September to January in the east.

### *Sylviinae*

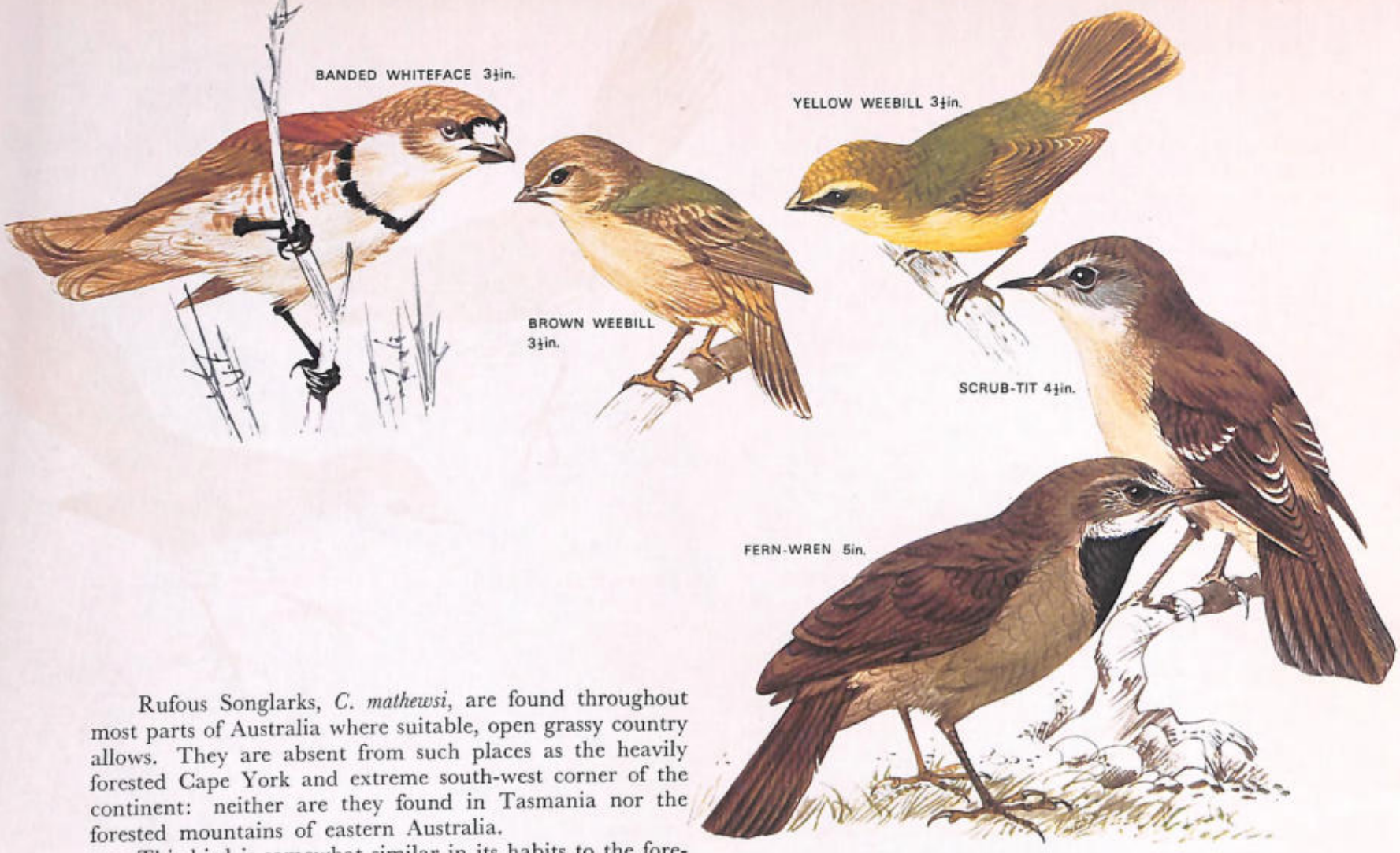
The sub-family *Sylviinae* is represented in Australia by eight species. The two songlarks in the genus *Cinclorhamphus* are fairly large, reed-warbler-like, birds.

The Brown Songlark, *Cinclorhamphus cruralis*, may be found in most parts of Australia where suitable open grassy habitats permit. Grass-plains and cultivated paddocks are the haunts of this bird. They are absent from Tasmania and, no doubt due to lack of suitable country, from Cape York.

They are a migratory species, moving north and south within the continent, and also perhaps, tending to move to more coastal plains in the breeding season. Brown Songlarks usually put in an appearance in south-eastern Australia during September, and depart again for the plains of the interior about February. In the south-west they are considerably earlier, arriving in June and July, nesting through August and onwards, and departing again by December and January.

This species spends a good deal of its time on the ground, where it forages for seeds and insects. The males will also frequently be seen perched on some vantage point such as a fence-post, stump or dead tree, from which they will sing.

They indulge in song-flights, soaring upwards with their legs hanging down, often gliding, and giving vent to their curious and creaking song. This has been rendered as 'witchy-weedle' and 'whittacker-whittacker' and likened to the sound of a wheel turning on a rusty axle. The singing bird descends on fluttering wings with a more chuckling song. When perched, these songlarks will sometimes elevate their tails to an almost vertical position.




Rufous Songlarks, *C. mathewsi*, are found throughout most parts of Australia where suitable, open grassy country allows. They are absent from such places as the heavily forested Cape York and extreme south-west corner of the continent: neither are they found in Tasmania nor the forested mountains of eastern Australia.

This bird is somewhat similar in its habits to the foregoing species, except that it is found in more heavily timbered country. It is a migrant to the southern parts of the continent, arriving during August, September and October, and departing between December and February in different localities.

This songlark may often be seen perched in a dead tree, on a stump or on a fence-post, from which the male sings vigorously but rather monotonously. He also sings whilst in short flights between perches. The notes sound something like 'wicha-poo, a-wicha-poo' and 'witchy-weedle', preceded, and followed by, a simple trill. The voice of this bird is sweeter than the harsh song of the Brown Songlark.

A grass, cup-nest is built, in a scrape in the ground. It is usually placed under the shelter of a tussock and is well concealed in the grass. Three or four whitish or reddish-white eggs are laid, heavily speckled with purple-brown and red, often more thickly at the larger end.

Like the Brown Songlark, the male is a little larger than the female, and the species is thought to be polygamous. The breeding season is from August to December in the south-east, but the birds have been found breeding in May in Central Australia.

The genus *Cisticola*, contains two Australian species. One is common and the other is a 'new bird', having been only recently recorded in this country. It seems to be establishing itself in northern parts of the continent, but is dealt with in the supplement. Both the *Cisticola* warblers are distantly related to the Tailor-bird of southern Asia.

The Golden-headed Fantail-warbler, or Tailor-bird, *Cisticola exilis*, is a common bird throughout much of its range, and is one of the few species that has benefited from man's activities, rather than the reverse.

They are found throughout northern, eastern and south-eastern Australia. The species also occurs sparingly on some Bass Strait islands and in the north of Tasmania. The species is largely coastal, but in a few suitable areas penetrates to the sub-interior.

The Tailor-bird frequents swampy areas, standing crops and, more rarely, open, grassy paddocks. They are vociferous in the spring and summer, and draw attention to themselves with their persistent singing and lively flights, just above the herbage.

The male's song is a buzzing 'zwitt-zwitt-zwitt-zwitt', followed by two or three sharper notes. He sings on the wing a great deal but also from a perch. Their rapid, low and rather erratic flight ends with a sudden dive into cover. They are not shy birds, however, and will perch and sing within a few yards of one.

The nest of this species is built in low vegetation, often near the edge of water but not necessarily so. It is a very attractive domed nest with an entrance near the top. Constructed of fine grasses, it is bound together into a purse-shape with spider-webbing, and frequently, leaves are stitched on to the outside. The living leaves amongst which the nest is built, are bent about the nest and stitched to it with spider-web threads; often a few leaves form a substantial roof to the domed nest. Occasionally I have found nests made entirely of grass in open paddocks, well away from water. In this case, cobwebs are still used to bind the nest together.

The male commences the nest, which apparently induces the female or females to proceed. He may start a number of nests and is sometimes a polygamist. The female finishes the nest, broods the eggs and raises the young without further assistance from her mate. However, he stays in the vicinity of the nest, singing loudly and indulging in showy exhibitions of low-flying. The three to five eggs laid are a beautiful sky-blue with a few dark brown and blackish spots.

In southern Australia, the Tailor-bird begins to nest early in October and continues until March. In the north, breeding starts later, from about January to March, except in places where irrigated crops spring up earlier than the

surrounding natural growth. It appears that the sight of the high growth is a 'trigger mechanism' starting the birds off on their breeding season. Such is also the case with various species of reed-warblers in Europe, according to studies by Klaus Immelmann.

Tailor-birds go into an eclipse plumage. The golden crown of the male becomes striped like the females, and both sexes grow noticeably longer tails. The singing displays cease, and the birds tend to congregate in loose flocks, to feed in crops and other concealing vegetation. The diet of the birds is moths, grubs, grasshoppers and various other small insects.

Our Reed-warbler, *Acrocephalus australis*, is closely related to the common species of reed-warbler in Europe and is in the same genus.

They are found throughout Australia and Tasmania, wherever suitable aquatic habitats prevail. Usually in pairs, these birds frequent reed-beds and sometimes other tall growth in and around fresh water. It is a fairly shy species, and more frequently heard than seen.

This species is one of our night-singers, and indeed, its rich voice has been mistaken for that of a nightingale's by early visitors to our shores. The vigorous song can be rendered 'twitchee-twitchee-twitchee, quarty-quarty-quarty'.

Reed-warblers are at least partial migrants within the continent. They depart from southern Australia in March and April and return during August and September to breed; in some localities they do not leave their haunts and spend the winter in the south.

A very well-constructed nest is built, in growing reeds or rushes. These strips of rush are woven about a number of standing stems until a deep cup is formed, which is rather narrow at the top. Presumably, this purse-shape is to prevent the eggs or young being flung out in a high wind. Some nest have no lining, while others are lined with a few grasses. In Western Australia the bird sometimes builds in the slender upright twigs of the swamp paper-bark tree. Before they are fully-fledged, the young birds have the habit of leaving the nest to clamber awkwardly about through the reed-stems.

The birds feed on various insects which are caught in the reed-beds and amongst the surrounding aquatic growth.

Four eggs are the usual clutch and these vary from pale greyish-white to a pale yellowish-brown. These are well spotted and blotched with brown and lavender. The breeding season is from September to December in the south-east, extending to February in the south-west of the continent.

The genus *Megalurus* contains two rather reed-warbler-like birds, which have much the same haunts as that species. They have, hitherto, been known as Grassbirds, but lately are being called Marshbirds in some publications.

The Little Grassbird, *Megalurus gramineus*, is found in the south-west of the continent, and from the Eyre Peninsula eastwards to Victoria, Tasmania and through to north-eastern N.S.W. Scattered numbers may also be found in Queensland. Outside Australia the bird also inhabits New Guinea.

The species is retiring, in that they seldom show themselves, although in many places they keep to their old haunts which are being encroached upon by human habitation. In many areas, these once plentiful birds have been reduced in numbers by cats, especially in swampy places not far from towns. Usually in pairs, these rather handsomely-marked little birds inhabit reed-beds and other areas of aquatic growth. As well as in freshwater marshes, they are also found in coastal marshes.

MALLEE HEATH-WREN 5½in.

CHESTNUT-TAILED HEATH-WREN 5in.

Some of the birds' squeaky, chattering notes 'resemble the sound made by reeds rubbing together'. The main call is a mournful 'pee-pee-e' uttered in the one key, and redolent of the marshy wastes in which the bird is often heard. They can often be called to within a few feet by an imitation of their call. Their diet consists of insects and seeds which they gather in the reed-beds and other low growth.

The nest is a deep cup or purse-shape, being slightly narrowed at the top. This, no doubt, is to save the eggs or chicks from being thrown out in a high wind. Coarse grasses and pieces of aquatic plants are woven to form the nest, which is well-lined with feathers. Usually built in the middle of a coarse tussock or a thick clump of reeds, the nest is often over the water. Occasionally the bird will nest in a thick ti-tree or a mangrove.

Three or four, and more rarely five, eggs form the clutch. These are reddish-white and thickly speckled with spots of purplish-red, sometimes zoning at the larger end. The breeding season is from August to January.

The Tawny Grassbird, *M. timoriensis*, is found in northern and eastern Australia from the Kimberleys in the north-west to the vicinity of Sydney. Outside the continent the species occurs in New Guinea and Timor.

REDTHROAT 4¼in.

SPECKLED WARBLER
5 in.
REED WARBLER
6½ in.
LITTLE MARSHBIRD
5 in.
Winter
TAWNY MARSHBIRD
7½ in.
TAILOR-BIRD
3½ in.
Summer

GREEN-BACKED WARBLER
4 in.
LARGE-BILLED WARBLER
4½ in.
DUSKY WARBLER
4½in.
MANGROVE WARBLER
4½ in.

This shy bird is an inhabitant of the dense reed-beds and other rank aquatic growth; they are also very common in the sugar-cane crops. They usually live in pairs, hiding themselves in the densest growth. The Tawny Grassbird has a harsh rapidly repeated call of 'chutch', but may also be seen and heard singing as it indulges in rapid song-flights, tumbling out a vigorous lark-like song, as it flies low over the vegetation.

The diet of these birds is insects and seeds procured from amongst the reeds and other thick growth.

A deep, cup-shaped nest is built, of dry grasses and lined with finer grass-blades and rootlets. It is well hidden low down in a clump of grass or reeds.

Three, or more rarely four, eggs are laid, these are whitish, freckled all over with purplish-red. The breeding season is usually from October to February but may sometimes be later.

The Spinifex-bird, *Eremiornis carteri*, is a northern Australian species, being found from about Cloncurry in central Queensland to the Fitzroy River in Western Australia and south to some distance below the Tropic of Capricorn. The species also occurs on Monte Bello Island and Barrow Island off Western Australia.

Usually seen in pairs, these birds inhabit dry country with a cover of triodia and other low scrub. They are a shy and rather retiring species. The birds spend much of their time on the ground, seeking insects.

In the breeding season the male becomes bolder and more conspicuous, as he sings frequently from the top of a bush. The ornithologist, F. Lawson Whitlock, likened the song to the French phrase, 'Je suis, a vous', although sometimes only the first two words are sung. As the male sings the female simultaneously adds a harsh 'jut-jut-jut' or 'thrip-thrip'.

The birds fly short distances from one clump of growth to another; as they go, the long tail is carried in a rather drooping position, almost seeming to hinder their progress. When the birds perch the tail is elevated.

Not a great deal of study has been done on this interesting species that has been known to science only since 1900.

An open cup-nest is built, of fine, shredded grass and other herbage. It is lined with rootlets and usually hidden in a clump of spinifex. It seems that the female builds the nest on her own, but the male bird assists in rearing the young. A nest on Barrow Island (which is roughly in the middle latitude of the birds' range), was found in August.

Two pinkish-white, slightly glossy eggs are laid. These are closely speckled with minute markings of pale lilac, and shades of reddish-brown.

*Malurinae*

The sub-family *Malurinae* contains the remainder of the Australian warblers. As stated in the introduction to the *Sylviidae*, this is a rather loose collection of genera, pending further knowledge and research by taxonomists into our warblers.

The genus *Malurus* contains the birds known to ornithologists outside Australia as the wren-warblers. To people in this country they are far better known as the fairy wrens. The group contains a number of the best-known and favourite Australian birds.

The Blue Wren, *Malurus cyaneus*, is probably the best known of the genus in eastern Australia. Its range extends from about the Warrego Range district in Queensland to Victoria and southern South Australia. It also inhabits Kangaroo Island and is the only member of the genus to have reached Tasmania, where it is quite common.

In pairs or in family parties, these lively and brilliantly-coloured birds are found in a variety of habitats. Light scrub, thickets along roads and hedges, and the bush lining the edges of streams and pools, are favourite haunts. It is common on farm-land and often lives in gardens, especially in country districts. The birds are restless little creatures, almost never still, as they hop and flit about the undergrowth in search of insects.

The song is a rapid reel of high lisping notes. The birds sing frequently in the spring and summer, and will quite often be heard at night. They also have a thin, harsh, scolding call when disturbed.

In the winter, family parties, perhaps comprising a number of broods, live together. After the breeding season the males lose their bright colours and moult into a brown eclipse plumage. They may then be distinguished by the black bill and the tail, which remains blue. Studies have shown that some males, at least, after about four or five years, moult from one breeding plumage into the next, never assuming the eclipse plumage. Further study on other fairy wrens may show that the same thing happens. For the first few months of its life a young male resembles a female.

A dome-shaped nest is built, with a side-entrance. It is composed of bark-fibres, grass and cobwebs, and thickly lined with feathers, wool or similar materials. It is usually very well hidden in thick growth near the ground.

Blue Wrens are multi-brooded and the young birds of an earlier brood will often help in the feeding of the next nestful. Seemingly unattached mature males will also join in this communal activity at times.

Three or four eggs are laid and these are whitish, spotted with red and brown. The breeding season is usually from July to December, but nests containing young or eggs are sometimes found later.

The Black-backed Wren, *M. melanotus*, occurs from central-western Queensland south to north-western Victoria and westwards to the Flinders Ranges in South Australia.

As a rule this species inhabits more open country than the preceding species does. Low scrub, such as mallee and mulga on the plains, is a favourite haunt, and they are also found on the scrubby slopes of low hills. They may be seen in pairs during the breeding season, and family parties throughout the remainder of the year. The high-pitched but rather musical song is similar to that of the Blue Wren.

A dome-shaped nest, with an entrance near the top, is made near the ground in a dense bush. It is constructed of grasses and bark-fibres and liberally lined with feathers, grass or other soft material. Three or four white eggs, finely freckled with red, are laid. The breeding season is from September to December.

The Turquoise Wren, *M. callainus*, is a South Australian species, distributed from the Eyre Peninsula across to the western end of Spencer Gulf. It ranges northwards to Central Australia.

In pairs or family parties, this brightly-coloured bird is quite common in various parts of its range. They frequent scrub country such as areas of mulga and saltbush.

They are similar in their habits and voice to the Blue Wren but are a shyer species. A domed nest is built, of soft grasses, into which plant-down is woven. It is hidden in a low bush, sometimes a dead one, or a thick tangle of grass.

Three or four eggs form a clutch. These are white, spotted with red or reddish-brown, similar to those of the other fairy wrens. The breeding season is from November to April.

The Banded Wren, *M. splendens*, is confined to Western Australia. It is most common in the extreme south-western corner from Geraldton to Esperance, but scattered colonies are recorded as far north as Shark Bay and the upper reaches of the Ashburton River and inland to Wiluna.

These birds are usually in small gatherings, even during the breeding season. There appears to be an excess of females, although it is probable that some of these could be immature males. It seems possible, from studies of the species, that these wrens may have the sociable habit of maintaining *group* territories, instead of individual pairs making up a unit. Sometimes several nests have been found next to each other, and there are records of two mature males feeding one nestling.

A rather untidy, oval nest is constructed, of dry grass, with an entrance at one side. It is lined with feathers and hidden in a bush or creeper at a height from ground-level up to about four feet. The three, or sometimes four, eggs are similar to those of the other fairy wrens. Six eggs have been found in the one nest, which were probably the combined laying of two females.

The male takes no part in the nest-building or brooding, although he helps to rear the fledglings. In the lower south-west the species breeds from about October to January.

The Black-and-White Wren, *M. leucopterus*, is confined to Dirk Hartog Island and Barrow Island, both off the coast of Western Australia. According to the early ornithologist and collector, F. Lawson Whitlock, the Black-and-White Wrens frequent the open flats of the islands, on which grow saltbush and other dwarf scrub.



The origins of these two colonies of Black-and-White Wrens, which are about three hundred and fifty miles apart, have been the subject of great conjecture. Two alternatives present themselves: did these birds evolve independently out of Blue-and-White (*leuconotus*-type) Wrens isolated on the two islands; or are the two populations survivors of a form which has since disappeared on the mainland? The second theory is perhaps more probable, and supported in some degree by the very dark specimens of *leuconotus* that have been collected from time to time on the mainland.

The nest is usually built close to the ground in a prickly *Hakea*. A strong, well-made, domed nest is constructed, of very fine dry grass, matted and bound together with spider-webs, wool and cocoons. A lining of fine grasses, cocoons and pieces of wool, is added.

Three or four eggs are laid, and these are white, marked with small spots and blotches of brownish-red: some eggs have a zone at the larger end. The males may sometimes breed before attaining full adult plumage.

The breeding season on Barrow Island is from mid-July to mid-September; while on Dirk Hartog Island, the end of August is the only recorded time, although the birds no doubt have a breeding season of two months or so.

The Blue-and-White Wren, *M. cyanotus*, is distributed through most of the drier, more inland parts of the continent, from northern Queensland down to north-western Victoria and further south to the vicinity of Adelaide in South Australia. This bird is also found in the Northern Territory and in Western Australia from the Pilbara district down to Perth.

Its characteristic habitats are dry areas, such as lightly covered sand-plains, *Casuarina* scrub on the low hillsides and the samphire-flats around salt-lakes and estuaries.

A typical domed wren's nest is built, of dried grasses, with an entrance to one side near the top. It is well lined with plant-down, wool or other soft material. The usual site is in a low bush only a foot or two from the ground.

Three to four eggs are laid which are white with purplish or reddish-brown spots, often with a concentration at the larger end. These birds are spring and summer breeders.

F. Lawson Whitlock rather picturesquely described this bird's song: 'If one imagines a toy sewing machine being run at a high rate of speed, the resultant sound would resemble the sustained reeling notes of these wrens.' It is a call quite different from those of almost all the other *Malurus* wrens.

The White-backed Wren, *M. leuconotus*, is now considered to be only a geographical variant of the Blue-and-White Wren, with the white on the wings joining across the lower back. Its general habits, nest and eggs are similar to those of *cyanotus*.

The Variegated Wren, *M. lamberti*, is a bird of the coastal districts of southern Queensland and N.S.W., to approximately two hundred miles south of Sydney.

In pairs or small family parties, these wrens are found in all kinds of undergrowth, heathlands, and the low scrub along the borders of bigger brushes. This species is considered to be shyer than some of the other wrens, with a call similar to that of the Blue Wren, but not quite so vigorous.

A domed nest is built, of dead grass and plant-down, and this is usually well concealed, near the ground in a low bush or tangled growth.

Three or four eggs are laid which are white or tinged with pink, and spotted in various shades of red. The breeding season is usually from September to December, but is sometimes later.

The Purple-backed Wren, *M. assimilis*, is considered

by many ornithologists to be a form or perhaps a sub-species of the Variegated Wren. Its distribution is from eastern Australia, west of the Dividing Range, ranging northwards to the Gulf of Carpentaria and south to north-western Victoria; through Central and South Australia it spreads to Western Australia, except in the extreme south.

In the main, they appear to have the same habits as their close relatives, *lamberti*. They are a very silent and retiring species, but do have a song consisting of a few brief chattering notes.

A typical dome-shaped wren-nest is built, with a side-entrance, and constructed of dry grass and the stalks of flowering plants and usually lined with plant-down.

The three, or sometimes four, eggs are white with spots of purplish-red, often zoned about the larger end.

The Red-winged Wren, *M. elegans*, is a species of the south-west corner of the continent. The range extends from about Moora, southwards to the westward parts of the Darling Range, and along the coastal districts eastwards as far as the Stirling Range.

This bird and the two wrens *lamberti* and *pulcherrimus*, are considered by some ornithologists to be but geographical forms of the one species.

It was thought that the three birds' ranges were exclusive of each other, but collecting data has shown that there is some overlap at the margins of their distributions. The forms remain differentiated in the overlap area (and do not interbreed) which indicates that they have become separate enough to justify being called full species.

The Red-winged Wren is noticeably larger than the other two species mentioned. It also shows a definite habitat preference for swampy areas which the other two lack. Once much more common, the spread of man and his agriculture and the draining of swamps has depleted this wren's numbers.

The most common site for the nest is in the base of a clump of sword-grass near a creek, but nests are sometimes found a few hundred yards from water.

The nest is a round, domed structure, frequently built of grasses, thin strips of *Leptospermum* bark and gum leaves from the *Eucalyptus rudis*. The chamber is thickly lined with plant-down, feathers, moss and soft shreds of bark. There is an interesting theory that the strong-scented gum leaves used in the nest, may be to deter the hordes of mosquitoes and other stinging insects frequenting the swampy habitat of the birds. Close observations at a number of nests have shown that the female alone builds the nest and incubates. The male assists in raising the young, and also other wrens, which appear to be the offspring of the previous season.

The two or three eggs are white and are sparingly spotted with rufous colouring. The markings often form a zone at the broader end. The breeding months are October and November and sometimes earlier.

The Blue-breasted Wren, *M. pulcherrimus*, is found in the southern part of the Eyre Pensinsula in South Australia, and also (except for the forests of the south-west corner) in south Western Australia, where it ranges north to the Murchison River district.

This bird is considered by some ornithologists to be but a form, along with *elegans* and *lamberti*, but there is a weight of evidence against this theory. As well as those points set out for the previous species, the Blue-breasted Wren is a *dry* country bird. Mallee, saltbush and poorly vegetated sand-plain country, are the habitats of this bird.

The habits of this wren are otherwise similar to those of the other Red-winged Wrens. They are not as rare as is sometimes suggested, but they are a very shy and secretive species.

The nest is similar to that of the Variegated Wren. Three eggs form the clutch and these are white, spotted with reddish-brown. The breeding season is from September to December.

The Lovely Wren, *M. amabilis*, is a northern species. They range from Cape York Peninsula down eastern Queensland to about Broadsound. Westwards they extend across the Northern Territory to the Kimberley District in Western Australia.

These birds are said to be similar in habits to the Variegated Wren, but show a greater preference for coastal districts. However, in the northern parts of their range they show a great fondness for sandstone gullies. They have the typical reeling song of the group, but it is a weaker song than that of the Blue Wren.

A domed nest is built of grasses, with a few skeleton leaves worked into it. It is placed low in a thick bush or other cover. Three white or pinkish eggs are laid which are speckled with reddish-brown. The recorded breeding season is from September to December.

The Red-backed Wren, *M. melanocephalus*, is found from Derby in Western Australia, through tropical northern Australia to northern Queensland. Mainly in the coastal areas, this bird's range extends southwards to the Manning River district in N.S.W. The thin, reeling song is similar to that of the Variegated Wren.

In pairs and family parties, these most unusually-coloured wrens frequent scrub and thick grass habitats mainly in damp places.

The nest is a typical domed structure with an entrance-

hole in one side. It is built of dead grasses and lined with finer grass stems. It is well hidden, low down in a tuft of rank grass or other growth; sometimes it may be built into vegetation over water.

Three or four eggs are laid which are spotted with reddish-brown. The recorded breeding season is from August to February.

The Lilac-crowned Wren, *M. coronatus*, is also distributed from Derby in Western Australia through the upper parts of the Northern Territory to north-western Queensland.

Very little has been recorded of this tropical representative of the family. They appear to have similar habits to their relatives. The tall cane-grass areas and pandanus palms growing near creeks and rivers seem to be the favoured habitats.

This wren is reported as being a quiet little bird; but some observers have heard it sing well. Its notes are not like those of most of the genera, but have been said to resemble a scrub-wren's song.

A bulky, domed nest is built, with an entrance to one side and near the top. It is constructed of thin strips of paper-bark interlaced with blades of cane-grass, and lined with grass rootlets. The nest is usually concealed in a growth of cane-grass.

Three pinkish-white eggs are laid and these are spotted with pinkish-brown. The usual breeding season appears to be from January to June, but nesting has been recorded later.

The genus *Stipiturus*, contains three species of small, decorative birds known as the emu-wrens. They are all rather shy birds, which spend their time quietly hunting for insects on or near the ground in low scrub. They all have strange, plumiferous tails which are mostly carried in an upright position.

The Emu-wren, *Stipiturus malachurus*, is mainly a coastal species, found from south-eastern Queensland to southern Victoria. It ranges westwards to south-eastern South Australia, and is also present on Kangaroo Island and in Tasmania. The West Australian population is distributed from Shark Bay (Dirk Hartog Island) to Israelite Bay.

Typical habitats in the west are wet heathlands (sometimes inland) and the poor vegetation of coastal sand-dunes. They may be seen in small parties or in pairs during the nesting season. In the east, their habitat is restricted to the semi-swamps behind the coast and they are common in the Grampians in Victoria.

The western bird has been divided into three geographic races. The birds in the race inhabiting the wetter, south-west coast region, are larger and more heavily streaked on their heads and backs; the drier inland areas are inhabited by a smaller, less heavily-marked race, and on Dirk Hartog Island there exists a still smaller race, which is greyer, and with yet lighter black streaking (Serventy and Whittell).

The Emu-wren is a shy, rather mousy bird, which keeps itself concealed most of the time in dense low undergrowth. However, it is readily called-up by squeaking. Its diet consists of insects and its chief call is a faint twitter.

A loosely-built, oval nest is made, with an entrance to one side near the top. It is built of grasses, and is well hidden in low thick foliage or grass.

Three, or sometimes four, eggs are laid; these are white and spotted with red freckles, particularly towards the broader end. The breeding season extends from August to December in various localities.

The Mallee Emu-wren, *S. mallee*, is, as its name indicates, the species found in mallee districts. It is restricted to areas of this scrub in north-west Victoria and adjacent parts of South Australia and N.S.W.

In small groups or in pairs, these little birds spend most of their time hunting quietly for insects on or near the ground in the scrub; they are closely associated with triodia in particular.

The nest and eggs are similar to those of the Emu-wren and the bird is a spring and summer breeder.

The Rufous-crowned Emu-wren, *S. ruficeps*, is widely distributed through Central Australia to the mid-west of the continent, where it is found from Pilbara to North-west Cape. Inland it ranges as far south as Naretha.

This bird frequents the triodia country and is also found in other areas bearing stunted scrub. It is said that it rarely flies unless hard-pressed—a remark that might be made about all the emu-wrens. If disturbed, it runs from one clump of cover to the next, uttering its faint shrill squeak.

Little has been observed of this species' habits, and few nests have been found. One described, was oval, with an entrance to one side and constructed of grasses, fine bark and cobweb. It was built about a foot off the ground into the middle of a small bush.

Two eggs were laid, which were white and well-marked with spots of reddish-brown, particularly on the larger end. The breeding season appears to be from September to November.

The *Gerygone* warblers are a group of eleven small birds which, on the whole, look rather similar. Four are distinguished by being birds of the mangroves, and the rest tend to be birds of the scrub and open forest, where they hunt actively through the outer foliage in search of insects. Many of these warblers have sweet songs.

The White-throated Warbler, *Gerygone olivacea*, is distributed generally through northern and eastern Australia, from Derby in Western Australia to north-eastern Victoria. More rarely, it has been recorded in southern Victoria and south-eastern South Australia.

In the spring this warbler has a most pleasing song. It is a descending scale of notes, considered by many people to be one of the sweetest of Australian bird songs. The popular names, 'Bush Canary' and 'Native Canary' attest to the opinions of country people about this warbler's voice.

White-throated Warblers are migrants within the continent. They move down into south-eastern Australia early in the spring. Scrub and open forests are the favoured habitats, where the birds may be seen hunting insects amongst the outer twigs and foliage. As the autumn progresses they move northwards again, to escape the dearth of insects in the south.

A rather neat, elongated, pear-shaped nest is built. The entrance hole, to one side and near the top, is hooded over with nest material. The nest is constructed of bark-shreds bound together with spider-webbing, and a tail hangs from the underside. Usually it is attached to the thin twigs of a gum sapling or a larger tree, at heights from a foot up to fifty feet from the ground. It is interesting that the birds often build in a tree infested with ants.

Three, or more rarely four, eggs are laid which are white, spotted with fine marks of purplish-red. The breeding season is from September to January in the case of the birds that migrate to the south. The warblers which stay up north nest about August.

The Brown Warbler, *G. richmondi*, is found from south-eastern Queensland down to eastern Victoria. These rather insignificant little brown birds are usually seen in pairs. They inhabit dense scrub during the summer and as the cooler months come on, the birds move into more open forest.

Brown Warblers are very active amongst the outer foliage of the trees and shrubs, where they hunt for all kinds of insects. This species does not have as full and sweet a song as the White-throated Warbler. The call-note sounds like 'citron-cit, citron-cit', repeated a number of times.

A domed nest is built, of grass and pieces of lichen, bound together with spider-webbing, and decorated on the outside with more flakes of lichen. Near the top is a spout-like entrance, and depending from the bottom of the nest is a tail of nesting-material. It may be built at almost any height, and is usually attached to thin twigs or a thorny vine in the forest.

Two or three white eggs are laid, and these are white, spotted and blotched with purplish-red. The breeding season is from September to January.

The Fairy Warbler, *G. flavida*, is confined to eastern Queensland, from about the Herbert River district to Bundaberg.

This warbler is a rather pretty bird, with its olive-green back and yellow underparts. It is the most brightly-coloured of the group except for the Black-throated Warbler.

The Fairy Warbler has a pleasant song, reminiscent of the White-throated bird's, 'but less wistful'. Like the other warblers, this bird spends most of its time out amongst the outer foliage, where it procures its diet of insects. Its favoured habitats appear to be scrub and trees bordering creeks.

A roughly globular nest is built, with a side-entrance near the top. This is protected by a noticeably larger hood than the other warblers construct. The nest is made of fine strips of bark bound together with spider-webbing. It is usually attached to thin horizontal twigs at a height from about five feet upwards. Often, this warbler will build in a tree that contains a colony of wasps.

Three eggs are the usual clutch, and these are a pinkish-white, spotted with red and brown. The breeding season is from September to December.

The Northern Warbler, *G. mouki*, appears to be restricted to the Cairns district in Queensland. It is closely related to the Brown Warbler, and it is not impossible that it may come to be considered to be but a form of this bird. It is similar in habits to the Brown Warbler, spending most of its time in the outer twigs and foliage of dense scrub.

A domed nest is built, with a side-entrance. The bird often builds over water, suspending its nest from thin twigs near the end of a branch.

Three pinkish-white eggs are laid which have freckles of reddish-brown. The breeding season recorded is from October to January.

The Buff-breasted Warbler, *G. levigaster*, is another northern species, found from Derby in Western Australia across to Cape York Peninsula.

This insignificant-looking, brownish bird, has much the same habits as the other *Gerygone* warblers. Most of the bird's time is spent actively hunting about the outer foliage and twigs in open forest and scrub-country. The call of this warbler is a delicate twittering, the fuller 'warbler-song' not having been noted.

A domed nest, with a hooded side-entrance is built, of grass stalks and similar material. It is usually suspended amongst the fine twigs near the end of a branch. A tree containing a communal nest of wasps is often chosen, presumably for protection.

Only two eggs are laid which are white, with small spots of reddish-brown. The breeding season is at various times of the year—regulated by the rainy seasons, but usually occurs sometime between October and March.

The Black-throated Warbler, *G. palpebrosa*, is found in northern Queensland from Cape York down to the Cardwell area. Outside Australia this bird also inhabits New Guinea and the Aru Islands.

These warblers are the most striking of the genus, and are the only ones with any kind of bold colouring. Usually in pairs, these birds frequent heavy, tropical scrub and forest areas. Typically warbler in their habits, they spend much of their time in the outer foliage, hunting for insects.

The young birds are rather unusual in that they have four peculiar head-plumes. If they are disturbed, the young birds raise their plumes and quiver them vigorously—which not doubt looks threatening to any but a human intruder.

A neat and compact, pear-shaped nest is built, which has a hooded entrance to one side near the top; there is also a tail-piece hanging below the nest. The materials used are palm-fibres and bark-shreds, bound together with cobweb. Lichen is often used in the nest and also to decorate the outside. The nest is suspended from thin twigs or a vine, and is frequently built close to the nest of aggressive wasps —presumably for protection. Indeed, this warbler is sometimes called the 'Hornet-nest bird'.

Two or three flesh-white eggs are laid which are speckled with browns or red. The recorded breeding months are from October to March.

The Western Warbler, *G. fusca*, which has also been lately called the White-tailed Warbler, is a widespread species. It is found throughout most parts of the interior and sub-interior and in the more southern parts of South Australia and Victoria. The bird is occasionally reported on the coastal side of the Great Dividing Range, but is more commonly found spreading to the coast in Western Australia.

These active little birds frequent the outer foliage and branches, where they hunt for insects. Like most of the warblers, their habit of feeding high in the trees makes them difficult to observe. They are, in fact, often better known by their song than their appearance. The notes have a melancholy air, and a sweetness reminiscent of the Brown Warbler's. The bird never seems to give a finishing flourish to its song, but dawdles pensively on with its melody. In some areas the song is heard only at certain times of the year, which suggests that perhaps the birds are somewhat nomadic.

This warbler's nest is an oval or pear-shaped structure, of fine bark and grass, matted and woven together with cobweb. There is a hooded side-entrance and usually a tail hanging below the nest. It is well lined with feathers. The nest is usually suspended in the outer twigs of a leafy branch at a height from a few feet up to perhaps twenty feet from the ground.

The two or three eggs are pinkish-white and speckled, particularly at the broader end, with reddish-brown. The breeding months extend from about October to January, or later, in various districts.

The Large-billed Warbler, *G. magnirostris*, is confined to the coastal districts of the Northern Territory and northern Queensland south to the Suttor River.

This species inhabits swampy places on the margins of creeks and rivers. Mangroves and swamped ti-trees are favourite haunts. Most of the time, the birds may be seen actively hunting through the foliage and blossoms in search of insects.

Their song is agreeable, although not approaching that of some other warblers for sweetness.

A domed nest with a hooded side-entrance, is built of shredded bark, and closely resembles an untidy piece of flotsam left by a receding flood or high-tide. The usual situation for the nest is in the thinner branches of a tree, often over the water.

Two or three white eggs are laid, and these are speckled and blotched with reddish-brown, mainly at the broader end. The breeding season can be anytime from September to April, varying with the season in different districts.

The Green-backed Warbler, *G. chloronota*, is another warbler of the north, found in the mangroves. This little bird is a retiring species, and its quiet habits and greenish colour make it difficult to find amongst the mangroves and in the adjoining scrub which it frequents.

They range along coastal north-western Australia and eastwards at least as far as the Northern Territory coast. Their habits are similar to those of the other 'mangrove-warblers'. These warblers have a slight, pleasant song, but it is not to be compared with that of some of the other *Gerygones*.

A domed nest is built, of fine rootlets and grass, which is suspended from thin twigs in a mangrove tree.

Two or three eggs are laid which are white with reddish-brown spots. Nesting birds have been found in October and the breeding season probably extends to about December.

The Dusky Warbler, *G. tenebrosa*, is confined to coastal mid- and north-western Australia, from Carnarvon north to about Port Keats. This is a mangrove species, and the birds spend most of their time hunting actively about in the foliage in quest of insects. Their rather delicate song is similar to the Western Warbler's but more lively. Dusky Warblers also have a scolding alarm-note.

A typical warbler nest is built of shreds of bark matted together with spider-webbing. It is domed, with a side-entrance, and is usually suspended in twigs over or near the water.

The two white eggs have reddish-brown spots and the breeding month recorded is October: no doubt the season extends over some time and varies with the rains.

The Mangrove Warbler, *G. cantator*, is a coastal eastern-Australian species, found from the Cairns district in Queensland to central N.S.W.

Mangroves and the adjacent scrubs, are the haunts of these birds and they may be seen moving actively about the foliage in quest of the insects upon which they feed.

In some localities, notably around Brisbane, these warblers visit the gardens of the suburbs. Their song is well known and the bird is sometimes colloquially known as the 'Queensland Canary'; the melodious and rather jolly notes are reminiscent of the whistling of a boy.

A neat, domed nest is built, which has a tail-piece and a round entrance to one side. It is composed of fine bark-fibres, rootlets and grass, bound together with cob-webbing and spiders' egg-bags; the egg-cavity is well-lined with feathers. The usual site is in the drooping twigs of a mangrove from two feet to ten feet above the ground or water.

Three white or pink eggs are laid which are speckled with reddish-brown. The breeding season is from August to December.

The genus *Acanthiza* contains a number of small birds called thornbills. These are amongst our smallest species, and are all rather similar at first sight. In fact the group contains more closely similar species than any other Australian genus.

A. G. Campbell's classification of these difficult birds has become the basis for subsequent work on the thornbills, but unfortunately his work did not indicate precisely how he arrived at his various races and sub-species. A subsequent revision of the Australian Thornbills by George Mack in 1936 (some-time ornithologist at the National Museum in Melbourne), is one of the most informative works on the subject. (See bibliography). As he says, these birds have provided more difficulties for the systematist than any other group of Australian birds.

In his paper, Mack reduces the seventeeen species of the R.A.O.U. checklist (2nd edition) to the more manageable number of ten, but with twenty-three races and sub-species; *Acanthiza pusilla*, for example, having as many as ten varieties, some of which are accorded full specific rank by other taxonomists.

In 1938 Mayr and Serventy published a paper on the subject in the *Emu*. Their work on the problem supported Mack's division of the birds into only ten species although they differed somewhat about the number of forms. As they point out, in the kind of hot, dry climate found in most of Australia, the new plumage acquired by birds after their moult does not remain pristine for very long. Thus, a series of skins from one locality and of one species, but taken at different times of the year, might differ more between themselves than two sub-species might. This is one of the reasons why so many species and forms were once accepted but are now being reduced. As an example of the earlier, 'splitting' tendency, Mathews has seventy species, sub-species and forms in his work of 1922.

A more recent note again, appears in Allen Keast's *Bird Speciation on the Australian Continent*, 1961. This work, and the other publications mentioned above, are necessary reading for anybody interested in pursuing the complex subject of the taxonomy of the thornbills.

In my treatment below I have named the seventeen species, accepted by the R.A.O.U. checklist, with an indication where the named birds are considered to be but *forms* and not full species. As stated elsewhere in this book, I am not proposing any taxonomic opinions, and as various ornithologists are still working on the thornbills, the R.A.O.U. checklist is still the 'official', if not the most informed, classification. Thirteen of the seventeen are illustrated, as reference was available for these, and as they perhaps best represent the extent to which the thornbills can be differentiated in the field, as opposed to museum-study skins.

The Little Thornbill, *Acanthiza nana*, is found throughout many parts of eastern and south-eastern Australia, from the Dawson River in Queensland down to south-eastern South Australia, where it ranges north to the Flinders Ranges.

In pairs or small scattered flocks and parties, these lively little birds may be seen hunting for insects in the outer foliage. They seem especially fond of wattles and *casuarinas*.

Little Thornbills call frequently to each other as they pass through the tree-tops, and the first indication of their presence is often the 'tiz-tiz-tiz' call.

A very small, domed nest is built, of bark-fibres and grass, and it may often be decorated with moss. The entrance-hole is near the top and the egg-cavity is lined with feathers or fur. The usual site is amongst the outer, leafy twigs of a tree, sometimes quite high off the ground.

Two to four eggs form a clutch, and these are whitish with freckles of reddish-brown and lavender. The breeding

months are from August to December.

The Striated Thornbill, *A. lineata*, is an eastern species, found from central inland Queensland to south-eastern South Australia. This thornbill also inhabits Kangaroo Island.

These birds mostly frequent the outer canopy of fairly high trees, and are rarely found in the underbrush. They are very active, and move so quickly that even at close range it is difficult to observe them closely. They can become quite bold, hopping into camps in the bush in search of crumbs of food. I have even seen them hopping along the logs of a smoking camp-fire. As they go, they keep up a busy twittering call.

The pear-shaped nest is made of bark and grass, matted together with spider-webs. It has a hooded entrance and is lined with feathers, fur or other soft material. It is usually built into the twiggy branch of a tree at various heights up to fifty feet or so.

Three pinkish or creamy-white eggs are laid which have small spots of reddish-brown. The breeding season is from July to December in various localities.

The Western Thornbill, *A. inornata*, is, as its Latin name suggests, an extremely plain little bird. This species is confined to the extreme south-west of the continent. It frequents the heavy forest belt, and is found from Moora southwards, and inland to the Stirling and Porongorups Ranges. This thornbill is common about Perth and the Swan River coastal plain.

These birds may be seen in the high foliage in various types of forest and scrub country, but they also spend much of their time hunting for insects at sapling and bush level. Their subdued colouring and quiet habits make them easily overlooked, but they are also inquisitive and can be attracted with imitations of their call.

They pair off during the breeding season, but otherwise move about in small flocks. The song of the Western Thornbill is a short and rather feeble tinkling sound, but it also indulges in mimicry of other bird-calls.

An oval, rather loosely-constructed nest is made. The material is usually grass, and it is lined with feathers. A variety of nesting situations are chosen. Some birds will nest in the centre of a thick bush, against the trunk, others in a hollow tree, with a knot-hole entrance. It may even be stuffed raggedly behind a loose flap of bark. Blackboy trees are also a common site, the birds building in the dry 'beard' of dead fronds, or in the crown of the tree.

Three eggs are the usual clutch and these are a pinkish-white, spotted with reddish- and purple-brown. These spots often form a zone at the larger end.

Apparently the female builds the nest on her own and incubates the eggs. The male bird, however, shares the duties of raising the brood. The breeding season is from September to December.

Tasmanian Thornbills, *A. ewingi*, are confined to Tasmania, King Island and the Furneaux Group of islands in Bass Strait.

These birds are similar in many respects to the Brown Thornbill and their ranges overlap. However, the Tasmanian species prefers thick cover and forest country, whereas the Brown Thornbill may be found both in forests and more open terrain.

The song of both birds is also quite similar, and it is strange perhaps that, with so much in common, they have remained differentiated as species. Chiefly as a winter movement, but sometimes at other seasons, the Tasmanian Thornbills will move out of the bigger scrub and forest into terrain with a cover of saplings and low scrub.

They are restless, quick-moving little birds and it is hard to follow their activities in the foliage. They are, however, inquisitive and can often be called up to within a few feet.

Tasmanian Thornbills build a rather neater and more compact nest than their relatives, and the round entrance-hole is protected by a hood. The domed nest is built of bark-fibres, and is often draped with moss; some nests are covered to the extent that they resemble neat, green balls of moss. They are usually suspended from a few small twigs in a bush or tree at heights up to about fifteen feet. Three white eggs are laid which are freckled with purplish-red. The breeding season is from August to December.

The Whitlock Thornbill, *A. whitlocki*, is found on the Nullarbor Plain and westwards. This bird is now considered to be only a variety of the Brown Thornbill. Except that they occur in a dry, stunted-scrub habitat, they are similar in most respects to the Brown Thornbill.

A typical *Acanthiza* nest is built in a low bush, usually only a foot or two above the ground. The breeding season is from July to November and the three eggs are similar to those of other thornbills.

The Mountain Thornbill, *A. katherina*, is only another

Most nests are from four to six feet off theground, but up to fifteen feet has been recorded.

The usual clutch is three eggs which are a pale pinkish-white, speckled reddish-brown. The breeding season is from July to October, and in favourable conditions, the birds will raise two broods.

The Brown Thornbill, *A. pusilla*, is found from southern Queensland to Victoria and Tasmania. Westwards it extends to the Eyre Peninsula. In Western Australia, there is a form of this bird named *A. apicalis* by some ornithologists. But Serventy and Whittell for example, in *Birds of Western Australia*, regard the western birds as a form of *pusilla* and discard the name *apicalis* altogether.

In pairs or in small parties, the Brown Thornbills frequent forest country and more scrubby growth. The thickets along water-courses are a favourite haunt. Most of their diet is obtained from the foliage, where they may be seen very actively hunting for insects. One of their habits is to fly up and down the outer foliage, rather inexpertly hovering, and picking insects from the leaves. In some districts they habitually visit parks, orchards and gardens where they are considered to be a useful species.

They have a pleasant chattering song and a 'chip-chip' call as they feed. These thornbills are also able to imitate some calls of other birds.

A dome-shaped nest is built, of grass, soft bark, leaves and spider-webs, and well lined with feathers. It is placed low down, and well hidden in thick growth: occasionally it is actually on the ground.

Three white eggs are laid and these are freckled with browns and purplish-red. The breeding months are from July to December in various parts of the birds' range.

The Broad-tailed Thornbill, *A. apicalis*, appears to be only a form of the Brown Thornbill, and is not even recognised by some ornithologists. (See notes on the previous species.) This is the Western Australian form, if it exists as such, and is distributed widely north to Shark Bay and Carnarvon, the upper Gascoyne River, and inland to the Opthalmia Range.

Its general habits, nest and eggs are similar to those of the Brown Thornbill. This western bird is recorded as carrying its tail upright in a wren-like position.

The Inland Thornbill, *A. albiventris*, is a bird of the interior of N.S.W. and parts of southern Queensland. In

variant of the Brown Thornbill. So far as they are distinguishable, the birds inhabit north-eastern Queensland from about Cooktown to Cardwell. The first records of the Mountain Thornbill were from the Bellenden Ker Range.

Neither the nest nor the eggs has been described.

The Slate-backed, or Robust-billed Thornbill, *A. robustirostris*, is a Central Australian species. This is a bird of dry, desert areas, carrying stunted cover such as mulga and saltbush. The birds feed in the foliage and twigs of the scrub and frequently utter a low-pitched twittering call as they move about hunting for insects. These thornbills also have a number of clear, vigorous notes, and a harsh 'thrip-thrip' alarm call.

A domed nest is built, with an entrance near the top. The upper half of the nest is usually less substantial than the lower. The whole is built of dry grass bound together with spider-web and a little lichen. According to F. Lawson Whitlock, who discovered the species, the site of the nest is very frequently a species of poverty-bush (*Eremophila pantoni*).

The nest may be found in amongst other growth and the bird will sometimes build in a bush growing all alone.

general it resembles the Brown Thornbill, but is even more arboreal. The call-notes of this bird are quite distinctive, once heard. Like all the thornbills, they are active and usually vociferous in their search for insects through the foliage.

The nest is an oval structure with an entrance near the top. It is built of shredded bark, pieces of wool, grasses and cocoons, matted together with cobweb. The normal site is in the outer, dropping leafy twigs of a sapling or bush.

Three flesh-white eggs are the usual clutch, and these are speckled with reddish-brown. The breeding season is from July onwards, probably until about December.

The Red-tailed Thornbill, *A. hamiltoni*, cannot legitimately be separated from the foregoing species. It is thus only a form, found in north-western Victoria and surrounding areas.

The Samphire Thornbill, *A. iredalei*, is mainly a bird of the interior, found from inland South Australia and Central Australia, extending to the central west coast. On the west coast it is typically found in the mangroves. Otherwise the habitat is samphire flats, open country with poor vegetation—the Nullarbor Plain, for example—and the margins of salt lakes.

They are a retiring and insignificant species, spending most of their time quietly in cover, hunting for insects. They do have a feeble song however, and a call of 'tsip-tsip' or 'tip-tip' rapidly uttered.

A rather elongated, or oblong domed nest is built, of thin strips of bark and plant stems. It is loosely constructed, bound together with spider-webbing and lined with plant-down. The nest is hidden in a low bush.

Three pinkish-white eggs are laid which have dull brownish spots. The breeding season is from July to October.

The Dark Thornbill, *A. hedleyi*, is now considered to be but a variety of the previous species, found in western Victoria and southern South Australia. In pairs, or sometimes small groups, they frequent swampy flats, both inland and on the coast.

They are a shy species, keeping themselves well hidden as a rule. Their song is a short, twittering warble.

The nest and eggs are similar to those of the Samphire Thornbill, and the breeding season is thought to be from September to November.

The Varied Thornbill, *A. squamata*, is a bird of the highlands. Not a great deal has been discovered of its habits. On the whole, these will probably prove to be much the same as those of the Buff-tailed Thornbill.

The bird probably breeds from August to November, and the nest and eggs are very similar to those of the Buff-tailed Thornbill.

Yellow-tailed Thornbills, *A. chrysorrhoa*, are one of the best known of the eastern *Acanthizas*. They range through Australia generally, south of the Tropic of Capricorn, and extend north in Queensland to the Gulf of Carpentaria.

In most parts of their range they are common, and they have taken well to living in farming areas. Their more natural habitat is open forest and all kinds of lightly covered country. They frequently visit orchards and gardens, where they no doubt clear up a large number of insects harmful to agriculture.

Much of their food is obtained on the ground, and they are more terrestrial than the other members of the genus. The song of the 'Tomtit' as it is popularly called is a rather sweet, animated, though characterless, succession of notes.

Out of the breeding season the birds flock, and may sometimes be seen in mixed groups with other species.



The nesting habits of this well-known bird are of particular interest. An untidy, domed nest is built, with an entrance-hole low down on one side. On top of this nest, however, a second cup-shaped nest is constructed. The eggs are laid inside the bottom chamber, and the cup on top has thus been the subject of much debate.

It was thought that the male bird might sleep in it, but there is no evidence to support this. Another theory is that it might be to delude the Bronze-Cuckoos, which parasitize this species, to lay their eggs in it. There is no evidence to support this theory either; on the contrary, the cuckoos continue to lay their eggs in the 'proper' place.

The most likely explanation seems to be, considering that the male bird builds the nest, that it is the result of the nest-building impulses remaining after the domed nest is completed.

I once found an interesting nest, which consisted of a domed nest with two compartments, one above the other, and with entrances facing in opposite directions. This also carried the usual open cup-nest on top.

The untidy nest is built of dry grass, plant-stalks, wool and any other soft materials, all bonded and matted together with cobweb. The nest-chamber is lined with wool, fur, feathers or some other soft material. It is usually slung from a few light twigs, or a drooping leafy branch at no great height. Sometimes the birds may nest as high as twenty feet.

Four white or pale-flesh eggs are laid which generally have a few speckles of reddish-brown. The breeding season is from July to December or sometimes later.

The Buff-tailed Thornbill, *A. reguloides*, is found from southern Queensland to Victoria and south-eastern South Australia. In pairs or flocks these small birds frequent scrub-land, lightly timbered hills, and open forests generally.

They are both terrestrial and arboreal, hunting with restless energetic movements for insects. Like most of the thornbills, they also have a jerky flight, almost giving an impression of stopping and starting in mid-air.

The domed nest of this species is composed of grass and soft bark, bound together with cobwebs. It is well lined with fur, feathers or other soft material. A variety of nesting-sites are recorded: behind a slab of loose bark on a tree,

PILOT-BIRD 6½in.

in a shallow hole in a tree-trunk, or in a low bush; nests have even been found on the ground under tussocks of thick grass.

Three or four white or flesh-coloured eggs constitute a clutch, and these have freckles of light red and brown. The breeding season is from August to December.

The Chestnut-tailed Thornbill, *A. uropygialis*, is found throughout most inland parts of Australia. It is absent from northern and coastal Queensland, eastern N.S.W., south and eastern Victoria, and the northern parts of Western Australia and the Northern Territory.

In pairs or small flocks at various times of the year, these birds frequent the various kinds of scrub found in the interior and sub-interior.

They hunt actively on the ground and through the foliage in search of the insects upon which they feed. The call-notes are a series of high, thin twitterings, and the courtship song is an 'excited, melodious trilling'.

This species is unusual amongst thornbills, in that it usually nests inside a hollow. Hollow limbs, stumps, old branches, and even crevices in fence-posts are utilized. Occasionally a pair of birds will nest in a hollow log lying on the ground.

Hollow trunks with a knot-hole entrance are favourite sites and the birds can squeeze themselves through surprisingly small apertures. Inside the hollow chosen, a domed grass nest is still built, which is well lined with feathers, fur or other soft materials.

Three whitish eggs are the usual clutch, and these are finely speckled with reddish-brown. The breeding season is from July to December and the birds often raise two broods in a season.

The genus *Sericornis* contains the seven scrub-wrens. Five of these look much the same as each other, although some are identifiable by their locality. But where the ranges of different scrub-wrens overlap, the birds can be difficult to identify with certainty. They are active birds but have a deliberation in their movements which some small birds, such as the thornbills, lack.

The White-browed Scrub-wren, *Sericornis frontalis*, is perhaps one of the best known of the group. It ranges from southern Queensland to Victoria and south-eastern South Australia, and is also present in the Kent Group in Bass Strait. It has not reached Tasmania, but in 1947 Dr D. L. Serventy saw what appeared to be one on Flinders Island in the Furneaux Group.

These birds are inhabitants of the thick underbrush and although retiring in their wilder habitats, soon become quite bold when living near human habitation. The food of these scrub-wrens is insects, grubs and small worms mostly picked up on the ground, but the birds also feed in low bushes.

The call of the birds is a sharp whistle and they also have a vigorous scolding note. This is a harsh 'wizzit-wizzit-wizzit', and is a rather fierce little call, heard up to a dozen times or so in succession.

A domed nest is built, with a side-entrance, and is made of bark-fibres, leaves and grass. It is usually on or near the ground in thick cover.

Three eggs are laid which are whitish or stone-grey with a zone of purplish-brown at the broad end. The breeding season is from July to December.

The Buff-breasted Scrub-wren, *S. laevigaster*, is distributed from north-eastern Queensland to north-eastern N.S.W. These birds frequent the thick brushes and wet scrub country found within their range. In pairs or small parties, they may be seen industriously working over the ground,

SPINIFEX-BIRD 5½ in.

pecking here and there as they go. Their insect and grub diet is also procured in the underbrush.

The domed nest of this species is chiefly made up of dead ferns, with a few other plant-pieces added. It is lined with feathers and is well hidden in low, thick cover.

Two or three eggs are the normal clutch, and these are brownish with darker, purple-brown markings tending to form a zone at the larger end. The breeding months are from October to December.

Little Scrub-wrens, *S. minimus*, are fairly common in the tropical rain-forests of north-eastern Queensland. Their range extends from Cape York down to about Cairns.

These scrub-wrens have much the same habits as the others: they hunt about on the forest floor, picking up insects, spiders, grubs and other tit-bits from the natural debris. They also forage through the tangles of low scrub and vines.

The domed nest is well camouflaged, being made of dead leaves and rootlets and lined with vine-tendrils and a few feathers. The nesting-site is usually low down in a scrubby tree or other thick cover.

Three eggs are laid which are a faint reddish-brown and zoned at the larger end with brown. The breeding season recorded is from October to December.

The Spotted Scrub-wren, *S. maculatus*, is distributed in south-western Australia from Shark Bay to Israelite Bay. It is also found on a number of islands off the coast of Western Australia. There is another population in South Australia from the Eyre Peninsula to Gulf St. Vincent.

Spotted Scrub-wrens frequent undergrowth of many kinds. The beds of dry water-courses, the scrubby growth on coastal dunes, paper-bark swamps and the dense thickets lining water-courses, are all typical habitats.

They are rather secretive birds by nature, like most scrub-wrens, but also seem to have a liveliness and natural curiosity, which allows then to adjust to human intrusion. Spotted Scrub-wrens can be called up quite readily with an imitiation of their sibilant calls.

The chief call is 'tsi-tsi-tsi-tsi', a loud and rapid succession of notes repeated many times; another common call is 'tseer-tseer' also repeated a number of times.

A domed nest is built with a side-entrance, and is made of grass, bark and leaves, and lined with feathers. Almost any situation on or near the ground is built in, and the nest is usually well concealed. Sometimes the nest may be in the leafy twigs of a low branch.

Three whitish eggs are laid which are spotted, mostly around the broader end, with purplish-brown and lavender. The breeding season is from September to January.

The Large-billed Scrub-wren, *S. magnirostris*, is an eastern Australian species, found from the Cooktown area in Queensland to the vicinity of Melbourne.

In the main, these scrub-wrens are a species of the coastal scrub and contiguous areas. Their habits are much the same as the other members of the genus; they hunt assiduously on the ground, flicking over dead leaves and other debris in search of spiders, insects and minute grubs. Some of their food is also procured amongst the foliage and twigs of the undergrowth.

The simple sharp calls are reminiscent of the White-browed Scrub-wrens; but not quite so vigorous.

A relatively large, oval nest is built, of dead leaves, moss and grass, and lined with feathers. The usual nesting-site is in the drooping twigs of a low branch or in a clump of vines. Tree-ferns are also favoured nesting-places, but it seems that this scrub-wren would prefer to take over the old nest of a Yellow-throated Scrub-wren whenever possible.

Three eggs are laid which are whitish or a grey-white, finely speckled with brown. The breeding months recorded are August to January.

The Brown Scrub-wren, *S. humilis*, is confined to Tasmania and various islands of Bass Strait. They are quite common, and may be found in the underbrush of gullies and hillsides and also in more open scrub country.

Occasionally this scrub-wren will visit gardens although normally it is a shy bird. The call note is a loud 'chip-chip' and there is also a thin high-pitched song that has been likened to the sound of a squeaky wheel turning. In the thick growth which it favours, the bird is more often heard than seen, although they can be called up by imitating the call. They are a nervous and alert species, and often the first to give the alarm when their sanctuary is intruded upon.

A bulky, domed nest is built, of dead leaves, grass and general bush debris. It is usually well hidden in a low bush or in a tussock.

The three or four eggs are a purple-buff or reddish, spotted and blotched with umber. The breeding season is from August to December.

The Yellow-throated Scrub-wren, *S. lathami*, is an eastern Australian species, found from the region of Cooktown in Queensland to the far east of Victoria. This is a species of the forest and dense scrub areas.

Usually seen singly or in pairs, these scrub-wrens are the most richly-coloured of the group. They are bold little birds, and will hop close by one's feet in search of minute insects and grubs. They search the forest floor very thoroughly and have a great air of concentration as they flick over the dead leaves, explore beneath fallen logs and delve into every nook and cranny.

The song is a very pleasant warbling and the bird intersperses this with mimicry of many other birds' calls.

A bulky, domed nest is built, with a hooded side-entrance. It is composed of rootlets, threads of horsehair-fungus, and skeletons of leaves, all mixed with moss. A feather lining is added, and the nest is built in the thin twigs of a pendulous branch that may often hang out over water. The site is not usually high, it may be from a foot or two up to about twenty feet from the ground.

Two or three eggs form a clutch which varies a good deal in ground colour. Eggs may be from almost pure white to a chocolate-brown colour. The breeding season is from August to February.

The Scrub-tit, *Acanthornis magnus*, is confined to Tasmania. It is a bird of the dense forests and scrub areas, being found in most parts of Tasmania where suitable cover prevails. During the summer this bird is sometimes seen out on the high moors, where it still keeps to the cover

of whatever vegetation is present.

On the scrubby and forested slopes of Mt. Wellington near Hobart, it is much reduced in numbers, possibly due to the depredations of cats. But in other parts of the State it seems to be maintaining its numbers.

Their call-notes are a 'to-wee-to', and a pleasant whistling song. One of their calls is very like a call of the Brown Scrub-wren. If disturbed from the undergrowth, the Scrub-tit does not usually fly straight off, but flits up to an exposed twig and pours forth a loud and musical call.

They are active little birds in their search for insects, busily working over the ground and low undergrowth. Sometimes the birds may be seen to ascend the trunks of trees, rather in the manner of treecreepers, but they do not appear to go out along the branches.

A fragile nest is built, which is domed and has a side-entrance. It is constructed of grass, moss, bark-shreds and fern-down, and lined with fur or feathers. The nesting-site may be in a thick shrub or a clump of ferns near the ground or much higher up in a mass of dead gum leaves. Another favoured site is amongst the dead fronds hanging down the trunk of a tree-fern. Quite often nests may be found that have blown down, as they are generally not attached securely to their surroundings.

The normal clutch is three white eggs, but four are sometimes found. These are white with red and brown blotches, mostly about the broader end.

The Redthroat, *Pyrrholaemus brunneus*, is a Central Australian species, found in the inland portions of all States with the possible exception of Queensland. In mid-Western Australia its range extends to nearer the coast.

Usually to be seen in pairs, these birds inhabit most types of arid, stunted scrub country. Most of the birds' time is spent on the ground, where they move rapidly about in search of insects. They also hunt through the low under-brush in search of food.

Redthroats have a very sweet and varied song of a warbling nature. Some of the songs have been syllabised as 'weet-weet, winit-winit, wer-re' and 'whrr-whrr-whrr-whrr, cheer-cheer'. The birds usually choose a twig at the top of a low bush as a singing post.

When the bird is disturbed and flies off ahead of one, a distinct and peculiar fluttering or soft whirring sound can be heard from the wings.

A globular nest is built of bark-strips and grass, which is usually lined with feathers. The site chosen is generally a thick low shrub, but nests have been found in hollow logs and one is recorded as being in the burrow of a lizard. The nest is frequently parasitized by the Black-eared Cuckoo, which is one of our rare cuckoos.

The clutch consists of three or four eggs which are a rich purplish-brown, shading darker towards their larger ends. The breeding season extends from August to November and sometimes later.

The Yellow Weebill, *Smicrornis flavescens*, has the distinction of being the smallest Australian bird. The species inhabits the inland, ranging through many parts of Central Australia, and north-western Australia to northern Queensland.

They are birds of the outer foliage, keeping high in the leafy tops, where their small size and greenish colouring makes them difficult to observe closely.

The loud, spirited call is often the first, and sometimes the only, indication of the presence of these birds. It is a loud call in proportion to the bird's bulk, and one might easily be misled into looking for a larger bird. A lively twittering is also kept up as groups of these weebills move actively about the foliage in their quest for insects.

The small, domed nest has a narrow entrance to one side, over which is built a protective hood. The nest is built of plant-fibres mixed with plant-down, and lined with more down or feathers. It is usually quite high in the outer foliage and twigs of a tree.

Two or three eggs are laid which are creamy-buff with purple-brown markings. The breeding season usually starts in about August and may run on to November or December; in some localities the birds have still been found nesting in April.

The Brown Weebill, *S. brevirostris*, is found from central Queensland down to Victoria, South Australia and south-western Australia, where it extends northwards to about the mid-western areas.

In pairs or small parties, these small birds spend their time hunting for insects in the outer foliage. They will be seen in both low saplings and tall trees. Brown Thornbills are continuously active, swinging and clinging amongst the leaves and thinnest twigs. Sometimes they hover about the outside of the leaf-canopy picking insects off the foliage.

Its chief call is a brisk chattering, uttered frequently. There is also a distinctive song which has been syllabised 'winnie wieldt' and 'pee-pee, p'wee-weep'.

These birds build a small, globular or purse-shaped nest, with a hooded entrance to one side near the top. A cup-nest is made first, and the hood is built on afterwards. Fine grasses and spiders' cocoons are bound with cobwebbing and the nest is usually suspended in thin leafy twigs. Nesting heights may be anything from two or three feet up to thirty or so.

Three, or sometimes only two, eggs form the clutch, and these are a creamy-buff or salmon, with brownish spots around the broader ends. In the east, the breeding season is from July to January, but in the south-west, August to October are the main breeding months.

The Fern-wren, *Oreoscopus gutturalis*, is confined to north-eastern Queensland, from Cairns to the Herberton Range. This is a mountain species found along the thickly-forested gullies and slopes, and preferably in damp, shaded places. In the quietness of the rain-forest one might sometimes hear this bird's low plaintive call; or attention might be drawn to it by the scuffling sounds it makes in the dead leaves on the ground.

Fern-wrens, although quiet in their disposition, are quite vigorous little birds. They hunt through the debris of the forest floor, sometimes tossing leaves and twigs into the air in the enthusiasm of their hunt for insects. Moss-beds and clumps of ferns are other places where this bird is likely to be seen foraging, and they also pry about under the peeling bark of fallen trees.

A domed nest is built, with an entrance at one side. This is a charming and decorative structure composed of fresh green moss interwoven with black fern-stems. The usual site is on the ground, sheltered amongst ferns or partly hidden in a hole in a bank of earth.

Two white eggs are laid and the breeding season is from July to February.

The genus *Hylacola* contains only two species. These are Ground-wrens, or Heath-wrens, as they have lately been called in some publications. They are shy, ground-frequenting birds of the mallee and heath country.

The Chestnut-tailed Ground-wren, *Hylacola pyrrhopygia*, is found from south-eastern Queensland down to southern Victoria and south-eastern South Australia where it ranges north to the Flinders Ranges.

These rather handsome little birds may be met with in

pairs or in small parties. As they are shy birds, they keep close to cover, seldom flying but moving quickly through the low growth in search of insects. They are almost always seen on or very near the ground, but occasionally a heath-wren will fly up to swing on the branch of a low bush, in pursuit of an insect. The tail is almost always held erect in a typical wren manner.

These heath-wrens have a particularly sweet and spirited song and they are also highly-skilled mimics of the songs and calls of other species. A single, sharp note is the alarm call, and is often the only indication of the bird's presence.

A fairly bulky, domed nest is built with a side-entrance, and made of grasses and pieces of bark. It is lined with feathers and placed on the ground in thick cover or in a low dense bush or tussock.

Two or three eggs form the clutch; these are pinkish white to buff and are spotted with purplish-brown. The breeding season is from July to November.

The Shy Ground-wren, *H. cauta*, is a bird of the interior outside the tropics. This species appears to be absent from Queensland, the Northern Territory and northern South Australia. They are typically birds of the mallee and similar low-rainfall scrub areas. Although not found in coastal areas as a rule, the Shy Ground-wren does inhabit Kangaroo Island.

These birds are retiring but are probably no shyer than the foregoing species. They spend most of their time on or near the ground hunting for the insects which form their diet. Nimble and quick in their movements, these little birds are difficult to find in the scrub, and once seen are easily lost again.

They have a spirited and sweet song which sounds something like 'chee-chee-chick-a-dee'. They also mimic the calls of other species, but not as expertly as the Chestnut-tailed Ground-wren.

A relatively large nest is made of bark and grasses and lined with feathers or fine grass. It is placed on or near the ground, usually at the base of a thick, sheltering bush or tucked beneath a fallen log.

Three, or sometimes only two, eggs are laid. These are buff or greyish, and sometimes quite dark. They are speckled dark purplish-brown, particularly around the larger end where some eggs even have a complete blackish-brown cap. The breeding season is from September to November.

The genus *Calamanthus* contained four species according to general opinion until H. T. Condon's view was published, based on his examination of skins. Condon states: 'A good series of skins from Tasmania, Victoria, South Australia and Western Australia has shown that there is a perfect gradation in size, plumage pattern and plumage coloration from east to west and north to south, with intermediates between the various forms . . . '.

Thus, what were once known as the Striated Field-wren, *Calamanthus fuliginosus*, the Rock Field-wren, *C. montanellus*, and the Rufous Field-wren, *C. campestris*, are now all regarded as geographic races of the one species.

This would now be called the Striated Field-wren, leaving one other possible species, the Rusty Field-wren, which may also be merely a geographic variant of the basic species. The four types have been illustrated, but one description is given to cover them all.

The Striated Field-wren, *Calamanthus fuliginosus*, is found in dry scrubby country throughout a large part of southern and Central Australia. The species in its various forms, ranges all the way from the west coast (North-west Cape) across to south-eastern N.S.W. and south-western Victoria.

In pairs or in small parties, they frequent heathlands, dry sandy areas, saltbush plains and other low-rainfall or poorly vegetated terrain, such as rocky foothills. They are a shy species, and hard to observe closely as they scurry through the low thick growth. In some areas they may frequently be flushed from roadside growth by passing motor vehicles, giving a clue to their numbers.

The field-wren has a bright, rather lark-like song, sounding like 'whirr-whirr-chick-chick-whirr-ree-ree'. It is usually poured forth in a loud rich peal from the topmost twig of a low shrub. The birds appear to maintain territories throughout the year, and sing in defence of them.

They feed on insects, which they hunt assiduously as they go mouse-like over the ground and through the undergrowth.

The nest is globular in shape, and made of grass, moss, leaves and plant stalks, with a lining of feathers. It is placed very low in thick vegetation or even on the bare ground, (a more common habit with the Western Australian forms).

Three, or sometimes four, eggs are laid, which are a light reddish-brown in ground colour. The cloudy markings, usually towards the larger end, are darker shades of brown.

The breeding season varies considerably in different localities; in the eastern parts of their range, Field-wrens tend to breed between July and December, but in drier areas they nest after rains, in both winter and summer.

The four species bearing the name Whiteface, and contained in the genus *Aphelocephala*, are small birds with a rather finch-like appearance. They are inland birds, and rather sociable in their habits, flocking together and with other species.

The Eastern Whiteface, *Aphelocephala leucopsis*, is distributed from the interior of southern Queensland, to central Victoria and inland South Australia.

This lively little bird is usually seen in flocks and often keeps company with numbers of Yellow-tailed Thornbills. Open-forest country and partly cleared agricultural land are the chief haunts of the species, where they spend a great deal of time hunting for food on the ground. The diet of these whitefaces is insects and probably seeds. The simple song is made up of a few bright notes, repeated a number of times.

A domed and rather loosely-built nest is made by these birds. Strips of soft bark and grass are woven together and lined with any kind of soft material. The nest is usually placed in the cavity of a stump, tree-trunk or fence-post, or alternatively in a thick shrub. Nests of this bird are also frequently found tucked into some suitable hollow in sheds and other buildings.

Three to five eggs are laid which are white to pale buff, with brown and greyish markings. The breeding season is from June to November.

The Western Whiteface, *A. castaneiventris*, is found through the inland areas of Western Australia through central Australia to the vicinity of Lake Eyre. Its range does not extend above the Tropic of Capricorn.

In pairs or small flocks, they frequent lightly wooded terrain, mulga thickets and similar habitats, in contradistinction to the other Western species of whiteface, which inhabits the plains areas more.

Most of this bird's time is spent on or near the ground, where it searches out insects and seeds. The song is a few plaintive notes; simple but musical.

A domed nest is built, of small sticks or rootlets, and lined snugly with feathers. It is generally concealed inside a hollow tree-trunk or dead branch, with a small entrance by way of a split in the wood or a knot-hole. However,

various other nesting-sites are used; odd places such as old tins lying on the ground, fallen logs, farm buildings, and even the old nest of a babbler, are frequently utilised.

Two, three, or sometimes four, eggs form the clutch, and these vary from pinkish to a pink-brown; they are marked, usually around the broader end, in purplish-grey. The breeding season is from August to October.

The Chestnut-breasted Whiteface, *A. pectoralis*, is a species found only in the interior of South Australia. Its range appears to be from Port Augusta up to the Oodnadatta area.

These birds inhabit the open dry country, lightly covered with stunted vegetation, that is typical of this area. They are similar in habits to other members of the genus, moving about the country in pairs or small gatherings. Little close observation has been made of these birds and neither their nests nor eggs have been described. They have a low plaintive call and, like their relatives, live on insects and seeds.

The Banded Whiteface, *A. nigricincta*, is found from Western Australia, between the Gascoyne River and the Murchison River district, ranging inland. It spreads eastwards through the centre to around Birdsville.

This is a species found in almost bare, open country; clay-flats and stony plains with thinly scattered scrub being the favoured habitat. They are similar in habits to the other whitefaces, picking up insects and a few seeds from the ground and travelling in small flocks as a rule. The song is said to be sweeter than that of its relatives.

A stick-nest is built which is quite different from the other whiteface nests. Black sticks are very frequently used and the nest has a long spout-entrance also constructed of twigs. It is never hidden away in a hollow log or other cavity, but is built into a prickly bush. The nest is well lined with feathers or flower-stems and flower-pods.

Three, or sometimes four, eggs are laid, and these are indistinguishable from the eggs of the Western Whiteface except that the average size is a little larger. The breeding season is from April to May.

The nine grass-wrens in the genus *Amytornis*, are rather strange-looking birds that live in some of the most inhospitable country of the interior. They are heavily striated in blackish-brown and white and spend all their time upon the ground. The grass-wrens run very fast, scampering in and out of the saltbush and bluebush clumps in an almost rodent-like manner.

Most of the species have not been very fully documented, no doubt due to their shyness and their rather inaccessible semi-desert habitat.

The Western Grass-wren, *Amytornis textilis*, is found in Central Australia, ranging south to the Gawler Ranges, and west to the more southern parts of Western Australia, except for the forested south-west corner; Point Cloates and Wiluna, are the northern extremes of its distribution in that State.

In pairs and sometimes small parties, these birds frequent the saltbush, bluebush and other low scrub areas. Almost always seen on the ground, these active birds run over the ground with surprising alacrity. Their long tails are usually carried erect and probably help to balance the birds as they scamper in and out of the low growth.

This grass-wren has a faint, high-pitched call-note, and also a quiet, plaintive song, which, however, seems to be seldom uttered. F. Lawson Whitlock also recorded a sound very similar to the mewing of a cat.

The females are distinguished by having rufous patches on the sides of the breast—which is the case with the females of most of the other species of grass-wren. The birds feed on insects and seeds, obtained on and near the ground.

A globular nest is constructed of dry grasses. The nest is fairly loosely put together and is actually a bowl-nest with an insubstantial dome or hood of grass over the top of it. There is no lining except the finer grasses used for the inside of the egg-chamber. A prickly bush is usually selected to build in, and the site is within a foot or two of the ground.

The two, or sometimes three, eggs are white or a pale reddish-white, marked with spots and blotches of purplish-red and underlying grey colours which have the appearance of being under the shell. There is a tendency for the markings to be zoned about the larger end. The breeding season is from August to October.

The Dusky Grass-wren, *A. purnelli*, is found in Central Australia. Its typical habitat is in scattered clumps of porcupine-grass growing on the lower slopes of ranges. It is an extremely shy species and little has been recorded of its habitats. So far as is known, they lead a similar life to the other grass-wrens. Most of their time is spent on the ground, where they run about in search of insects and seeds. The song of this bird is 'a sweet twittering'.

The nest is a globular construction of grass similar to that of the preceding species, and placed in a clump of porcupine-grass. Two white eggs are laid which are spotted with red. The breeding season varies, as the birds nest after rain.

The Striated Grass-wren, *A. striatus*, is distributed through the drier interior of N.S.W., north-western Victoria and southern South Australia to the Eyre Peninsula.

In pairs and sometimes small parties, these birds frequent dry sandy areas and poor scrub country. They run rapidly over the ground and are seldom observed for more than a few seconds at a time. Like the other grass-wrens, they are a shy species.

A partly domed nest is built, of bark-fibres and dry grass, based on a foundation of bark. It is placed close to the ground and is hidden in, or under, the shelter of a spinifex tussock.

Two white eggs are laid which have spots of reddish-brown and lilac. The birds breed after rain.

The Rufous Grass-wren, *A. whitei*, is distributed from inland mid-western Australia to central Australia and south to the Musgrave Ranges in South Australia.

Spinifex country is the typical habitat of this grass-wren. It is similar in its habits to the rest of the genus, spending most of its time upon the ground. The bird is a rapid runner and retiring in its habits. It has been little studied. In some publications, this bird and *A. striatus*, are treated as the one species.

The male bird has a pleasant, clear song, which he sings from the top of a low bush. The bird will sit on its perch and sing for ten minutes at a time on sunny days. The call is a liquid 'tu-tu-tu' and a calling bird will often be responded to by other grass-wrens in the vicinity.

The nest is an open cup and so differs from those that have been found belonging to other grass-wrens. Built of dry leaves or spinifex grass, it is lined with soft material such as kangaroo-fur.

Usually, two white eggs are laid which have small spots of brownish-red. The birds will breed at any time after good rains.

The Eyrean Grass-wren, *A. goyderi*, is apparently confined to the vicinity of Lake Eyre in South Australia.

This desert-dwelling species was discovered by a party of explorers in 1874, but since then was seldom heard of until in 1961. In that year, a party of bird-students found a

pair north of Lake Eyre and photographed their nest, which contained two young birds.

The pair of grass-wrens were living in a rough cane-grass area, and the species appeared to be very rare. These two birds appeared to be similar in their habits to the rest of the genus, and ran swiftly through the grass, uttering a faint two-syllable whistle, 'swi-it, swi-it'.

The nest was typical of the grass-wrens, but as it contained young, the eggs have yet to be described. It was found in September.

White-throated Grass-wrens, *A. woodwardi*, are confined, so far as is known, to the area about the South Alligator River in the Northern Territory.

Little is known of the birds' habits except that they 'run very fast and hide under rocks'. Neither the nest nor the eggs have been found by anyone who has described them.

The Red-winged Grass-wren, *A. dorotheae*, is found on the McArthur River in the eastern Northern Territory. This very shy and wary bird haunts the high sandstone country and rocky slopes of the ranges. Porcupine-grass areas are the typical habitat.

They are very shy and hide amongst the rocks, spending almost all their time upon the ground like the other grass-wrens. Apart from this, little is known about the birds.

A bulky, domed nest is constructed, of dry spinifex stems and dead eucalyptus leaves, and the nest is woven into the top of a clump of grass.

Three white eggs form the clutch, and these have pinkish markings. The breeding is probably from about October to January.

BLUE WREN 4¼in.

BLACK-BACKED WREN 4¼in.

BANDED WREN 5in.

WHITE-BACKED WREN 5in.

BLACK-and-WHITE WREN 5in.

PURPLE-BACKED WREN 5in.

BLUE-and-WHITE WREN
WHITE-BACKED WREN

VARIEGATED WREN
5in.

BLUE-and-WHITE WREN
4¼in.

The Black Grass-wren, *A. housei*, is another species about which little has been recorded. They appear to be confined to north-western Australia, and have much the same habits as the other grass-wrens.

These birds have been seen running swiftly over boulders, with head and tail lowered, but they are shy and difficult to observe closely.

Neither the eggs nor the nest have yet been discovered and described.

The genus *Dasyornis* contains the three species of bristle-birds. The generic name is a combination of two Greek words and means, literally, 'hairy-bird'. The 'hairs' referred to, are two or three strong bristles which curve up and out from the base of the bill. It is thought that these bristles might give some protection to the bird's eyes as it pushes through the thick grass and undergrowth.

Bristle-birds were one of the early species of Australian bird to be discovered around Sydney soon after settlement began. The botanist George Caley, a collector for Sir Joseph Banks, appears to have bestowed the name 'bristle-bird'.

The birds are short-winged birds and have strong legs—which one would expect considering their largely terrestrial habits. They move very quickly over the ground, often carrying their tail erect, and are quite difficult to observe closely. However, bristle-birds are also curious and will come up within a short distance of a quiet observer.

Damp heathland, water-meadows and the thick vegetation along the banks of creeks are typical bristle-bird haunts. They may also be found in heathy country up to about the 4,000 foot level in mountainous country. Bush-fires, settlement and the general disturbance and despoiling of their habitat has driven the birds from many of their old haunts, but here and there they are still quite common.

There are two species, the Rufous Bristle-bird and the Bristle-bird. The latter was, until fairly recently, considered to be two species—the Eastern and the Western. Now, however, they are considered to be slight geographic variants of the one bird.

The Rufous Bristle-bird is a coastal species found in the south of Victoria and South Australia. After a gap of nearly two thousand miles, they crop up again in a very restricted area on the Western Australian coast. It appears that the bird was once distributed more or less continuously along the entire southern coast. Geographic changes, creating the dry Nullarbor Plain, have cut off the two populations from each other.

The Bristle-bird, *Dasyornis brachypterus*, is found in various localities from the extreme south-east of Queensland down to eastern Victoria. They frequent swampy heath-lands and the rank, damp undergrowth adjacent to forested hill and mountain country. These birds may also be seen in similar growth near the coast.

They are retiring birds, but curious enough to approach a quiet observer. Most of the birds' time is spent on the ground where they hunt for insects and seeds and berries. Bristle-birds are able to run rapidly through the thickest vegetation and only fly for short distances.

They have a loud, rich song which has 'a mystic quality'. A call-note may also be heard that has been syllabised 'ip-per-tee-chee' and a sharp 'szwit' alarm-note.

A dome-shaped nest is built, with a side-entrance about two inches in diameter. It is loosely put together and is made of dry leaves, grass and grass stems, and lined with finer grass or other soft material. A base of leaves or bark is usually put under the nest and the site is in a tussock or a low bush.

Two white, or whitish-brown, eggs are laid which have spots of brown. The breeding season is from August to December and occasionally on to January.

What used to be called the Western Bristle-bird, *D. longirostris*, is now considered to be the same species as *brachypterus*, as explained in the introduction to this genus. The Western Australian birds were considered to be very rare, but they have been seen lately in small numbers in the vicinity of Albany and King George Sound on the extreme south coast. These birds breed from October to January as a rule, and their nest and eggs are, of course, very similar to those of the eastern population.

The Rufous Bristle-bird, *D. broadbenti*, is found only along the coastal districts of Victoria and south-eastern South Australia. It reappears again in a very restricted area of Western Australia, being found along a narrow coastal strip, from Cape Naturaliste to Cape Leeuwin, a distance of barely sixty miles.

Low scrub of the various kinds found along the littoral and contiguous areas, are where one would find this bird. They are very shy and retiring, spending most of their time on the ground and running rapidly off into cover if disturbed.

The greatest concentration of the species is in south-western Victoria, where it may quite often be heard. Its common calls are 'chip-chip-chewee' and 'chip-choowee', followed by a softer 'choo-a'. The alarm-note is a loud and brisk 'queek'. This bristle-bird also has a most pleasant sub-song or whisper-song.

A globular or oval nest is made, with dry leaves, rootlets and grasses and lined with finer materials of the same kind. It appears that the female bristle-bird builds the nest on her own and does all the incubating. The male, however, brings food to her on the nest and also assists in raising the young.

Two pinkish-white eggs are laid, well-marked with reds, grey and umber; it is remarkable that one of the two eggs laid is very frequently infertile (A. G. Campbell).

The breeding season is from September to December in the east, but the bird is often a late breeder in South Australia, commencing about December. The nests of Rufous Bristle-birds have not yet been discovered in Western Australia.

The Rock-warbler has the pleasant and euphonius Greek/Latin name of *Origma solitaria*, 'the solitary bird of the caves' would be a rather free rendering of this, and the bird is indeed a warbler of sandstone and limestone terrain. They are confined to the rocky areas in the Hawkesbury River district in N.S.W.

They frequent ravines and rocky hillsides and are mainly found near swiftly-running streams. These rather sand-stone-coloured warblers are very active little birds which spend the major part of their time on the ground. They move busily over the rocks and through the underbrush and fallen logs in search of insects.

The calls are as brisk and sharp as the bird, and some-times they can be heard to mimic the calls of other species.

A domed nest is built, with a neatly hooded entrance to one side. It is composed of bark-fibres, rootlets and grass and decoratively covered with mosses and cob-webbing. A lining is added, of soft fibres and feathers. The nest is built in a variety of situations, but the most typical site is the roof of a cave. Other sites include sheds and other buildings, culverts, drains and mine-shafts. Where the nest is attached by the top to the roof above, it is made almost entirely of cobwebs.

Three white eggs are laid which occasionally have a few fine spots. The breeding season is from July to December.

The Pilot-bird, *Pycnoptilus floccosus*, is distributed from the Blue Mountains and the Port Hacking district in N.S.W. along the Dividing Range to the Dandenong Ranges in Victoria.

This species inhabits the most heavily timbered mountain-slopes and dense brush-filled gullies. Owing to the nature of its haunts, the Pilot-bird is much more frequently heard than seen.

The bird was given its name because of its association with the lyrebird. As the larger bird scratches and digs over the forest floor, a pilot-bird will often be in attendance to snatch up its share of titbits. Other species also 'pilot' the lyrebirds, notably the Yellow Robin.

Insects of any kind, worms, grubs, small fruits and seeds are eaten by the Pilot-bird. Very small fresh-water mussels are also taken. The birds have well-developed legs and frequently thrust aside relatively large twigs and pieces of bark in their search for food—an action reminiscent of the lyrebird with which they so freely associate. They seldom perch in trees and will not be seen to fly very often.

The male bird only, is thought to give the well-known 'guinea-a-week' call, and the female will often respond immediately with a 'qui-wit-tui-wit-tee'. There are various other calls which are very melodious and of surprising volume for a small bird. The 'guinea-a-week' call is frequently incorporated into the lyrebird's song.

The nest is built by the female alone, in two days as a rule, low down in forest debris or other thick cover. A domed nest is constructed, of bark-strips, rootlets, and dead leaves. The outside is rather untidy but the inner section is neatly-built of bark-fibres and grass with a lining of feathers. Frequently there will be a small platform built out near the entrance hole.

The colour of the two eggs varies a good deal, and may be from smokey-brown to a dusky grey. The Pilot-bird's nest is frequently parasitized by the Fan-tailed Cuckoo. The breeding season extends from August to February with the peak being during the summer.

The Speckled Warbler, *Chthonicola sagittata*, ranges from central-eastern Queensland down to Victoria and eastern South Australia.

Dry, open-forest country, with light underbrush, and also more park-like country with well-spaced timber, are the chief habitats of this warbler; although for lack of another space, it is illustrated perched upon a reed.

Much of the time this bird will be seen upon the ground hopping about in search of insects, grubs and seeds. However, it will quite readily perch in bushes and trees. In its feeding, the Speckled Warbler will sometimes be found associating with other terrestrial feeders, such as thornbills, finches and whitefaces. Outside the nesting season they tend to gather in small parties.

The most frequently heard call of the species is a 'charring' chatter, but there is also a sweet, though slight, song. If alarmed, the Speckled Warbler will fly up to a low branch to scold the intruder with subdued harsh notes, interspersed with mimicry.

A nest of dead grass and bark is constructed which closely resembles its immediate surroundings of natural debris. Inside, the nest is more neatly finished off with bark-fibres and grass and then lined with feathers or fur.

The breeding season is extended, nests having been found from late winter to the following autumn.

The three, or sometimes four, eggs are an unusual, deep chocolate-red colour. The Black-eared Cuckoo, which lays eggs of a similar colour, frequently parasitizes this bird; the warbler is, in fact, the chief host of the cuckoo.

DUSKY ROBIN
6½in.
PINK ROBIN 5in.
SCARLET ROBIN
5in.
HOODED ROBIN 6½in.
ROSE ROBIN 4½in.
RED-CAPPED ROBIN 5in.
FLAME ROBIN
5in.

# MUSCICAPIDAE
## Old World Flycatchers

For most ornithologists, the term *Muscicapidae*, covers all that group of ten-primaried Oscine birds that are adapted to capturing insects in the air during short flights from a perch. (A few flycatchers have expanded their hunting methods to include capturing insects on foliage in a warbler-like manner, and some others pounce on insects on or near the ground.)

Some writers lump all these birds more or less together, while others divide the group into varying numbers of sub-families or tribes. Before a reasonable classification of the flycatchers can be arrived at, natural groups must be made from out of this heterogeneous collection of genera which, after all, appear to have no more in common that their feeding habits.

Mayr and Amadon (1951) have made a start, by suggesting four sub-families or tribes: the *Muscicapinae* (typical flycatchers), *Monarchinae* (monarch flycatchers), *Rhipidurinae* (fantails) and *Pachycephalidae* (whistlers).

To break down the classification of these birds below family level is not an easy task. There is much differing opinion, and perhaps even more begging of the question, in publications on the subject.

In Australia, the question of whether there should be a sub-family *Monarchinae*, and if so, which genera it should contain, is a very vexed one. The placing of the Boat-billed Flycatcher also raises problems of its own.

In a paper on the classification of the Old World Flycatchers (*Emu*, Vol. 58, p. 277), G. M. Storr has outlined and discussed the problems very clearly, and put forward his views on the matter. It is on his paper that these notes are based.

Although the *Muscicapidae* exists largely on the strength of morphological similarities, the feeding habits of many flycatchers grade into those of robins, chats, warblers and shrikes. So also do such morphological characters as bill-shape, the development of bristles about the lores and the relative strength of wings and feet. So it will be seen that precise delimitation of the flycatchers as a taxon is impossible if based only on morphological criteria.

There is another, more serious objection to considering the *Muscicapidae* as a taxonomic whole, and that is, that they are almost certainly polyphyletic, which is to say they have evolved from various stocks. It seems likely that there has been a parallel evolution of 'flycatchers' from different insect-eating species in separate parts of the world. If the group was indeed monophyletic, there should be little trouble in isolating non-adaptive characteristics that flycatchers have in common, to the exclusion of other insect-eating birds.

In fact, however, the flycatchers have *only* been characterized by adaptive, morphological criteria concerned with their feeding habits (such as bills, bristles, wings and feet).

The four sub-families of Mayr and Amadon mentioned above, are at least as acceptable as any other attitude to the group, and may on the whole, still prove to be the most correct. It is generally accepted that further knowledge is required before the problem can be solved with complete satisfaction.

The *Monarchinae*, the *Rhipidurinae* and the *Pachycephalinae* certainly seem to be natural families, although their nearest relatives are unknown.

The Australian robins (*Petroica*, *Microeca*, *Eopsaltria*, etc.) are another fairly well-defined group, but their relationships with other groups is contentious. These robins show evidence—according to Storr—of being specialized derivations of the thrush/robin/chat complex, and he would, therefore, place them with the *Turdidae*.

*Machaerirhynchus*, the Boat-billed Flycatcher of Australia, remains a problem. Storr would tentatively place it next to the *Ficedula* in the *Turdidae*. It is an interesting reflection on the complexity of the problem, that *Ficedula* (the Narcissus Flycatcher of Asia), is placed by many other taxonomists in the family *Muscicapidae* and sub-family *Muscicapinae* and not in *Turdidae*.

In the treatment of the flycatchers which follows below, the classification to which I am committed happens to follow the views set out by Storr quite closely. The main exception is the troublesome Boat-billed Flycatcher; this has been placed, at rather a loose end, following the already somewhat vague sub-family, *Monarchinae*.

### *Muscicapinae*

The Australian flycatchers and robins (which are not related to the European robins) are divided into four sub-families, which helps to some extent in sorting out the forty-three species.

The first sub-family is the *Muscicapinae*, which (except for the scrub-robins), contains all the Australian robins—the red-breasted and yellow varieties—three flycatchers and a few 'odd robins'.

The Brown Flycatcher, *Microeca leucophaea*, is a well-known and much loved little bird. They are found in many parts of Australia where the habitat permits. It is absent from deserts, and the denser jungles in the far north, and absent also from the south-west corner of the continent.

The Brown Flycatcher, or Jacky Winter as it is frequently called, appears to be quite undisturbed by the spread of farms and homesteads in country areas, and has taken quite readily to nesting in gardens.

They are fearless birds, and will dart and hover around one's head or feet to snatch insects out of the air or small fry disturbed on the ground.

It has a sweet, rather lisping song, in addition to its well-known call of 'jacky-jacky-jacky' or 'peter-peter-peter'.

The nest is a delightfully neat and small structure about two inches across, made of grass, horse-hair and scraps of lichen, bound and matted together with spider-webs. As a rule, it is built snugly into the horizontal fork of a branch,

at almost any height, from a foot or so up to seventy feet from the ground.

Two pale greenish-blue eggs are laid which are marked with spots and small blotches of purplish-brown and grey. In some cases the markings form a zone at the larger end. The breeding season is from August to December.

Lemon-breasted Flycatchers, *M. flavigaster*, are northern birds, found in northern Australia from the Kimberleys to northern Queensland, as far south as the latitude of Mackay, but probably not on the coast.

This bird, unlike the Brown Flycatcher, is largely arboreal. It is a very lively little bird, dashing out from its perch on a branch or fence-post, to capture a passing insect, or flicking momentarily down to earth to pick up some tit-bit. It has a bright, twittering song which is extremely varied. The early morning song is particularly fine. There are reports of mimicry of other species' songs by this bird.

The nest of this flycatcher is even smaller than that of the foregoing bird, being only about one and a half inches across by half an inch deep. Constructed of bark-fibre and grass, it is bound and matted together with spider-webs, and built neatly into the horizontal fork of a branch. A dead branch is often chosen and the nest may be at almost any height.

The one egg laid is a very pale blue, finely spotted with purplish-red. The breeding season is from October to January.

PALE-YELLOW ROBIN 5in.

NORTHERN YELLOW ROBIN 6 in.

5 in.

SOUTHERN YELLOW ROBIN

WESTERN YELLOW ROBIN
6 in.

LITTLE YELLOW ROBIN 5 in.

WHITE-BREASTED ROBIN 6½in.

WHITE-FACED ROBIN 5in.

The Brown-tailed Flycatcher, *M. brunneicauda*, is a bird of north-western Australia extending into the western areas of the Northern Territory.

This flycatcher is usually found in open forests and mangroves. It is a quieter bird than the other *Microeca* flycatchers, living in the thick growth where it hunts for insects. Various small forms of marine life are added to the diet where the species is inhabiting mangroves. The first indication of its presence may be its call notes which are described as 'loud and distinctive'.

A small, neat cup-nest is built, of bark and pieces of leaf, bound together with cobwebs and attached to the branch of a mangrove tree. One pale bluish-grey egg is laid, with chestnut markings over purple. The nesting season is from October to December.

In the genus *Petroica* there are the five red-breasted Australian robins and two more soberly-coloured species, one is black and white, and one a dusky-brown.

The Scarlet Robin, *Petroica multicolor*, is a widely-distributed bird in eastern Australia and there is also a population in the south-west corner of the continent. They are rare in north-east Queensland but become more plentiful further south. Scarlet Robins may be seen in many parts of N.S.W., Victoria and south-eastern South Australia. The species also inhabit Kangaroo Island, Tasmania, Norfolk Island and some other Pacific Islands.

Scarlet Robins are usually seen in pairs, frequenting scrub, open woodland, and orchards and gardens in settled areas, depending on the time of year. They are fairly quiet birds, and spend most of their time in low growth, from which they frequently dart down to pick up insects and other small fry from the ground. They often perch sideways on a vertical trunk, in the same manner as the yellow robins. The call-note is a slight trill, and the song is a more sustained trilling.

A beautiful nest is built, of dry grass, fibrous-bark and mosses. The thick walls are bound and matted together with cobwebs and there is a lining of hair, feathers or wool. It is built into a forked tree-branch, or in the hollow of a trunk or on an old stump, at a height usually not more than about fifteen feet. However, it may be much lower, or even as high as sixty feet.

As part of his courtship display the male feeds the female; he takes no part in building the nest, but may share in the incubation. The young are fed by both birds.

Three or four greenish-white eggs, with brown speckling over grey, are laid. The breeding season starts early—about July, and goes through until December.

The Red-capped Robin, *P. goodenovii*, is found in many parts of the interior of Australia, extending to the coast in only a few districts, although it is reported to be a coastal bird in winter in mid-Western Australia.

They are usually seen in pairs, and they like scrub country and open forest as a habitat. These robins feed on the ground a good deal, but also pursue flying insects. They dart out from their perch in a flycatcher manner, or flutter up from the ground to snap at some low-flying insect.

The Red-capped Robin is closely related to the Scarlet Robin and there is at least one case of interbreeding reported from Victoria.

The call-note is a gentle tapping or ticking sound, not unlike a clock ticking, and the territorial song has been described as 'tick-it-terr-rri-ri-ri', and has a rather lisping quality.

A very decorative nest is built by this species; cup-shaped and made of green mosses and lichen strengthened with a few fibrous pieces of bark. Spider-webbing is frequently used to bind the whole together. The lining is soft material such as rabbit-fur or hair. The nest is built into the fork of a branch, often quite near the ground, but sometimes it can be up to forty feet above the ground.

The male birds will breed before attaining full adult plumage; in which case they are in a similar garb to that of the female. Both parents assist in raising the young brood.

In the west, the breeding season is from July to October; nests have been found in Central Australia in April and May, and in the south and east of Australia the breeding season is from September to December. Two, or occasionally three, bluish-white eggs, minutely spotted with browns over spots of violet-grey, are laid.

The Pink Robin, *P. rodinogaster*, is not very widely distributed, only being found in the south-east of Australia. It ranges north to about Canberra, south into Tasmania and is rarely found in South Australia, except for a few instances of birds nesting over the border.

They are quite common in their favoured localities; they frequent heavily timbered mountain ranges and gullies,

and dense ferny creek-banks. They are rarely seen in very open country, but do tend to move into more lightly timbered areas in the winter. In the winter I have seen them above the snow-line in the north-eastern highlands of Victoria.

Tasmania is the stronghold of this species, where it may often be met with in the mountainous country. It is perhaps heard more often than seen, and its pleasant, trilling, though slight, song is heard in the breeding season. This robin also has a quiet 'tick-tick' call. It is an inquisitive little bird and will often follow one for a distance, tick-ticking from dense cover. Most of the bird's food is obtained upon the ground, where insects of various kinds are procured.

The nest is considered by some people to be the most beautiful of all the handsome nests built by robins. It is an open cup, built of green moss bound together with spider-webs and draped on the outside with lichens. The lining is soft material such as fur or the down from the fronds of tree-ferns. It is built into a forked branch and as a rule is not very high off the ground.

Three or four greenish-white eggs, with pale brown spots and underlying lavender markings, are laid. The breeding season is from September (in Tasmania) to January, or later in some parts.

Rose Robins, *P. rosea*, are found in the coastal and mountainous areas of eastern Australia, from lower north-eastern Queensland to south-western Victoria.

In pairs as a rule, they frequent the coastal rain-forests and the scrub and forest-covered slopes of the ranges. During the autumn and winter months, these birds tend to move out into more open country. They have a typical robin-song, rather slight and twittery, but quite pleasant; these birds also have 'churring' call-notes.

They are not terrestrial feeders to any extent, like the other red-breasted robins, but take most of their insect-food from the foliage or pursue it in the air in a flycatcher manner.

A small, neat nest is built, of soft plant-fibres and moss, matted together with cobwebs and lined with fur or plant-down. It is handsomely decorated on the outside with lichens. As with the other red robins' nests, this usually makes an effective camouflage.

It is usually built into the fork of a branch at a considerable height from the ground. Two or three blue-grey eggs are laid which are speckled purplish-brown. The breeding season is from October to December.

The Flame Robin, *P. phoenicea*, is another eastern species. It is found from south-eastern Queensland through to south-eastern South Australia. It also inhabits Kangaroo Island, the islands of Bass Strait and is very common in Tasmania.

It seems that there may be some seasonal migration of these robins across Bass Strait, between Tasmania and Victoria, and their movements are currently being studied. In the late summer and early autumn I have seen numbers of these birds on small Bass Strait islands; larger numbers than one would imagine to be a natural population of such small land-masses. The brown birds, which would be females, and possibly immature specimens of both sexes, far outnumbered the red-breasted adult males.

In pairs in the spring and summer, these birds frequent the coastal ranges and breed there. In the autumn and winter they move into the more open plains in small flocks and family parties. During this season they may often be seen in fields and orchards, seeking insects upon the ground.

In Tasmania at least, and perhaps in other places, there appears to be some segregation of the sexes in winter. The flocks of Flame Robins seen in the fields are predominantly of males. The females may flock separately back in the forest country or remain scattered (Sharland).

A cup-shaped nest is constructed, of soft bark, grasses, and a few rootlets, and lined with fur or plant-down. Many sites are recorded for the nest, such as a cavity in a creek-bank, behind a loose piece of bark on a tree, open sheds, woodpiles, a hollow log, and many other places.

Four bluish-white eggs are laid, which are finely dotted with shades of brown and underlying markings of lavender. The breeding season is from September to January.

Included in the genus *Petroica* are two robins that lack

the red breasts of their relatives, but are otherwise not dissimilar in their habits.

The Dusky Robin, *P. vittata*, is confined to Tasmania and various islands in Bass Strait. It frequents lightly timbered country and farming land. This is a friendly little bird and may often be found in the vicinity of homesteads. Patches of land newly cleared of cover are favoured spots, where it apparently finds an ample supply of insects. It is a ground feeder, and will quickly appear where wood is being chopped or the ground dug up, boldly picking up grubs and the like.

The note of this robin is a low and somewhat melancholy 'choo-wee, choo-wee-er'. It is not as common as it was once, probably due to the depredations of cats.

The nest is a cup of bark, rootlets and grasses, and is rather untidily built. Tree-cavities, in the end of a log or on the branch of a small tree, are common nesting-sites.

Three or four greenish eggs are laid which are sometimes spotted with brown. The breeding season is from July to December.

The Hooded Robin, *P. cucullata*, is a very handsome black and white bird found in most parts of Australia except for tropical north-eastern Queensland and Tasmania.

The males are showy birds but they can easily be overlooked, being quiet and unobtrusive in their habits. Hooded Robins are not vociferous, but when they do call, their 'yapping' notes are quite distinctive. The birds call during darkness, and immediately before and after dawn. During the day they are usually silent.

They are usually seen in pairs, frequenting lightly covered or cleared land. Like most of the *Petroica* they are ground feeders, where they hunt for insects of various kinds.

A cup-shaped nest is built, of rootlets, soft bark, or grasses, or a combination of such materials. It is lined with hair or plant-down, and the whole is matted together with cobwebs. The nest may be built into the fork of a tree or a hole in a stump or tree-trunk. It is usually within ten feet of the ground, but may be as high as twenty feet.

Two, or occasionally three, eggs are laid. These vary in ground colour, often within the one clutch. They may be apple-green, bluish or sometimes pale brown. A few markings of brown usually form a cap at the larger end. The breeding season is from August to December.

The young bird is not illustrated, but it is worth noting that it is streaked black and whitish, both above and below except for a white abdomen.

The genus *Poecilodryas* contains but two species, both birds of the thick brush. The White-browed Robin, *Poecilodryas superciliosa*, is confined to coastal northern Queensland. This is a rather secretive and subdued species, frequenting thick vegetation, usually in the vicinity of running water.

Most of this robin's food is obtained upon the ground, but this bird may also be seen hopping along large branches or perched against a tree-trunk searching for its insect food. The only note I can find on the voice of this bird states that they utter 'subdued calls'. Any calls that it does have, are seldom uttered.

A neat, cup-shaped nest is made, of small twigs and dry leaves, matted together with cobwebs. The usual site is in the horizontal forked branch of a tree near the edge of the jungle or thick scrub.

Two pale greenish eggs, with purplish-brown or chestnut markings, are laid. The breeding season is from October to January.

The Buff-sided Robin, *P. cerviniventris*, is another northern species. It is found across the top of the continent, from north-western Australia to north-western Queensland. Some taxonomists consider this Robin and the White-browed Robin to be conspecific.

This robin is a bird of brush country found frequently along creeks, and consequently in the mangroves. Its diet consists of insects hunted for both on the ground and over the tree-trunks and branches. The call-note is a 'loud piping whistle', repeated a number of times. However, as a rule, this bird is a silent one.

A shallow, cup-shaped nest is built. This is a slight structure, made of grass, fine rootlets and plant-tendrils, and built into the forked branch of a mangrove tree.

Two pale green eggs are laid which have reddish-brown markings, usually forming a zone. The breeding season is from October to January.

The genus *Eopsaltria* is a fairly large one, containing seven species, most of them being the yellow robins.

Southern Yellow Robins, *Eopsaltria australis*, are common and well-known birds throughout much of their range. They extend from the south-east corner of South Australia through Victoria to N.S.W. but are absent from Tasmania, where this genus is not represented at all.

This is a trustful bird, at times appearing quite

unafraid of man. It will often suddenly appear out of the scrub to perch on a nearby branch and regard one quietly out of its large black eye. They frequently perch sideways against a trunk, and also have the habit of flicking their wings or tail whilst perched.

The call-note of this yellow robin is a loud double 'choo-choo', almost thrush-like in its intensity. Its other call is a monotonous and very plaintive piping; a 'tu-tu-tu-tu' sound repeated many times. The bird is one of the first birds to call at dawn and is one of the last birds to call as night falls. They also pipe out of sight in the thickets when disturbed.

This bird's diet consists of insects of various kinds, many of which are picked up from the ground.

A cup-shaped nest is built, neatly made of bark-strips, a few grasses and sometimes pieces of paper or rag. The nest is bound with matted cobwebs. Sometimes the outside of the nest may be decorated (and camouflaged) with pieces of lichen. It is usually built into an upright fork but may be on a horizontal branch, at heights from a foot to about twenty feet from the ground.

Two, or sometimes three, eggs are laid, which may be apple-green to greenish-blue. These are marked with shades of brown. The breeding season is from July to January.

The Little Yellow Robin, *E. kempi*, is confined to north-eastern Queensland, from Cape York to the Atherton Tableland, and the upper reaches of the Burdekin River.

This bird frequents both dense scrub and more open forest areas. Sometimes they may be seen on the ground looking for insects, but much of their food is procured amongst the leaves and branches where they hover around the outside of the foliage canopy, picking insects from the leaves. They also have the flycatcher habit of sitting on a perch, waiting to dash out when some flying insect comes within range.

Neither the nest nor the eggs of this bird has been found by anybody who has described the species.

Western Yellow Robins, *E. griseogularis*, are restricted to the south-west corner of the continent, south and west of a line passing from the mouth of the Murchison River to Moora, Merredin, Parker's Range and Norseman (Serventy and Whittell).

In some places this robin appears to be decreasing in numbers, and also seems to be visiting the coastal plains less frequently in the winter. No definite cause has been found for this decline in population over the last thirty years or so.

They inhabit brush and open-forest country where they obtain much of their food upon the ground. Insects form the birds' diet, and the trunks and branches of trees are also searched for these. The western bird has the typical habit of the genus of perching sideways against the trunk of a tree. The alarm note is a harsh 'chit-chit' or 'chit-chit' pause 'chit-chair'.

A deep cup-shaped nest is built, beautifully constructed of strips of bark bound together with spider-webs. The inside of the nest almost always contains three or four dry jarrah (red-gum) leaves upon which the eggs are laid. The nest is usually camouflaged to conform with the bark of the tree in which it is built.

A clutch consists of two eggs which are buff or occasionally olive, or dull apple-green. These are marked with brownish blotches, often forming a zone at the larger end. Inland, the breeding season is September and October, but may be as late as December on the coastal plain.

The Northern Yellow Robin, *E. chrysorrhoa*, is found from the latitude of Cooktown in Queensland to about the Hunter River in N.S.W. This species is closely related to the Southern Yellow Robin, which it resembles in both habits and voice.

The northern bird may be distinguished by its brighter yellow, almost golden rump, which shows up brightly in the dense forests which this robin inhabits. It is known to frequent the forests of the coastal belt, and it may also occur in similar habitats further inland.

One of this bird's calls is the typical yellow-robin 'choo-choo'. It also has a soulful and monotonous piping call; an oft-repeated 'tu-tu-tu-tu' which is heard very early in the morning and is often the last diurnal bird's call at night.

Most of the insects which form this robin's diet are procured on the ground. Tree-trunks and branches are also searched for insects. Like its relatives, this bird often perches sideways against a trunk, flicking its tail and wings.

The cup-shaped nest is made of bark and plant-fibres and lined with small dead leaves. It is built into the fork of a branch or vine, and is not usually high off the ground. Two or three pale greenish eggs are laid with brownish spotting. The breeding season is from July to December.

The Pale-yellow Robin, *E. capito*, is found only from about the Cooktown area in northern Queensland down to

the Williams River or Barrington Tops area in central-eastern N.S.W.

There is an interestingly tight relationship between the distribution of this species and the occurrence of the lawyer-vine. This is a plant bearing long bayonet-shaped leaves, with sharp prickles along their edges. This relationship between bird and plant arises out of the robin's nesting habits. Almost always the nest is built in a lawyer-vine; either against the stem, supported by projecting leaves, or in an upright fork of the plant.

The Pale-yellow Robin is quiet and retiring and has a subdued voice. It has the robin habit of clinging sideways to a tree-trunk, often flying up to perch for a moment between forays on the ground for insects. It will also dart out from a perch, in a flycatcher-like manner in pursuit of passing insects.

These robins are noticeably large-headed little birds, indeed, the northern form of the species, which is slightly smaller, was at first known by the awkward name of Lesser Large-headed Robin.

The nest is built of leaves, plant-fibres, small pieces of bark and similar material. It is bound together with cobwebs and often decorated on the outside with moss and small flakes of bark and lichen. At the nest the sitting bird is very trustful and can even be touched on occasion without showing much alarm.

Most, if not all, of the brooding is done by the female, but the male is in frequent attendance. He brings food to his mate and feeds her on the nest or on a nearby perch. Both parent birds rear the fledglings.

Two greenish-white eggs are laid with yellow or chestnut markings. The breeding season is from August to December.

The White-breasted Robin, *E. georgiana*, is confined to south-western Australia. In the main, this robin is found in the extreme south-west in various kinds of thick scrub, but it also ranges in smaller numbers through the coastal thickets of scrub to about Albany.

These robins frequent areas of luxuriant vegetation, particularly in the vicinity of creeks. Their insect-diet is found both on the ground and on tree-trunks and branches. They cling sideways to trunks in the same manner as most other robins, sometimes freezing quite motionless and sometimes flicking their tail and wings.

The main call of this bird is a 'chit-chit' and is invariably uttered as a warning if its mate is brooding or accompanied by young birds. Both birds will employ the 'broken-wing' trick, if the nest is happened upon. They fall

to the ground, and go off trailing one wing as though wounded, to decoy the intruder away.

They are quiet and retiring birds, but also inquisitive. If one sits quietly in the scrub, one of these robins will often come and sit on a nearby twig to watch. They also sometimes frequent country gardens and orchards.

An open nest is built of dry grass, rootlets and similar materials. No lining is made, but the outside of the nest is often draped with lichen and bark to help hide it. The nest-site is usually low down and a *Leptospermum* or a paper-bark is the usual tree used.

Two eggs are laid which may each be a different colour. They may be light olive, pale brown, or a light blue. Close examination will reveal faint markings of a liver-colour. The breeding season is from September to December.

The White-faced Robin, *E. leucops*, is found in Australia only from Cape York to the Rocky River district. It is also in New Guinea.

Little is recorded of the habits of this robin. It is a quiet and retiring bird, and its call-note, which is a short harsh 'chee-chee-chee', is heard only occasionally.

Like the other robin in this genus, it procures a good deal of its insect-food on the ground, but also searches the bark of tree-trunks and branches.

A cup-shaped nest is built, of fine strips of bark, dead leaves and moss. It is lined with dry leaves and often decorated on the outside with flakes of white paper-bark. The usual nesting-site is in a lawyer-vine, in a fork or where the leaves grow from the stem, and at heights up to twenty feet or so.

Two greenish-white eggs with reddish spots are laid. The breeding season is from December to January.

The genus *Peneoenanthe* contains but one species, the Mangrove Robin, *P. pulverulentus*. This robin is found along coastal northern Australia from Exmouth Gulf to Rockingham Bay in Queensland.

As its name suggests, this is a bird of the mangrove swamps. They appear to be mainly arboreal, and capture their insect-food amongst the foliage and branches of the trees.

Not very much has been recorded of the habits of this species although observers report that it is very tame, flying about overhead as if unaware of human presence. The call is a low whistle, most frequently heard during the birds' breeding season.

BROAD-BILLED FLYCATCHER 6in.

The nest is a neat and compact cup of strips of bark, bound and matted with cobwebs. It is lined with dry grass and decorated on the outside with strips of bark. The usual nesting-site is the forked branch of a mangrove tree at heights up to fifteen feet or so from the water.

Two eggs is the normal complement, and these are light green to dark olive-green, speckled with small spots of reddish-brown over lilac markings. Recorded breeding times are August and September to January.

Grey-headed Robins, *Heteromyias cinereifrons*, are confined to an area about two hundred miles long in north-eastern Australia. They are found in the heavily timbered ranges between Cooktown and Cardwell.

This bird, which is in a genus of its own, was discovered in 1875, although it has been studied but little since. An early collector noted, in 1888, that the favourite haunts of this attractive little robin were the edges of clearings and tracks through the dense forest. The birds flit out into the sunlight to snatch a passing insect, and then fly back into the shade of the scrub. Another habit is their frequent motionless perching on a low branch. They peer intently down, and then suddenly drop to the ground to pick up an insect or grub.

Their usual call-note is recorded as 'a loud whistle followed by two or three lower notes, all monotonously repeated'. The bird also has a chattering call and a feeble whistle.

The nest is an untidy, shallow, cup-shaped structure of rootlets, twigs and leaves. It is decorated on the outside with moss and usually built in a lawyer-vine. Small palms and bushes are also nested in, usually at four or five feet from the ground.

One egg is the usual clutch, and this is cream or a pale green freckled and blotched with browns and purplish markings, which often form a zone at the larger end. The breeding season is from September to January.

### *Rhipidurinae*

This sub-family contains four Australian species, but the group as a whole, is fairly wide spread. They range from south-east Asia, down through the islands to Australia and New Zealand, and further eastwards to many Pacific islands.

The *Rhipidurinae*, or fantails, are characterized by their long, broadly rounded tails. These are used with great effect, being constantly wagged (an unusual movement amongst birds) and bobbed up and down. Quite frequently, the tail is also opened and shut, fan-wise, as the birds perch.

They are restless and extremely active birds, seldom still for more than two seconds at a time. Fantails are erratic fliers and perform amazing aerial evolutions in pursuit of flying insects. Grazing cattle and sheep are often attended upon by one member of the family—the wagtail, which perches on their backs and horns, or flies about their feet to snatch up insects disturbed by the walking animals.

Many of the fantails have responded favourably to the spread of civilization and cultivation, and some species live and breed freely in proximity to buildings.

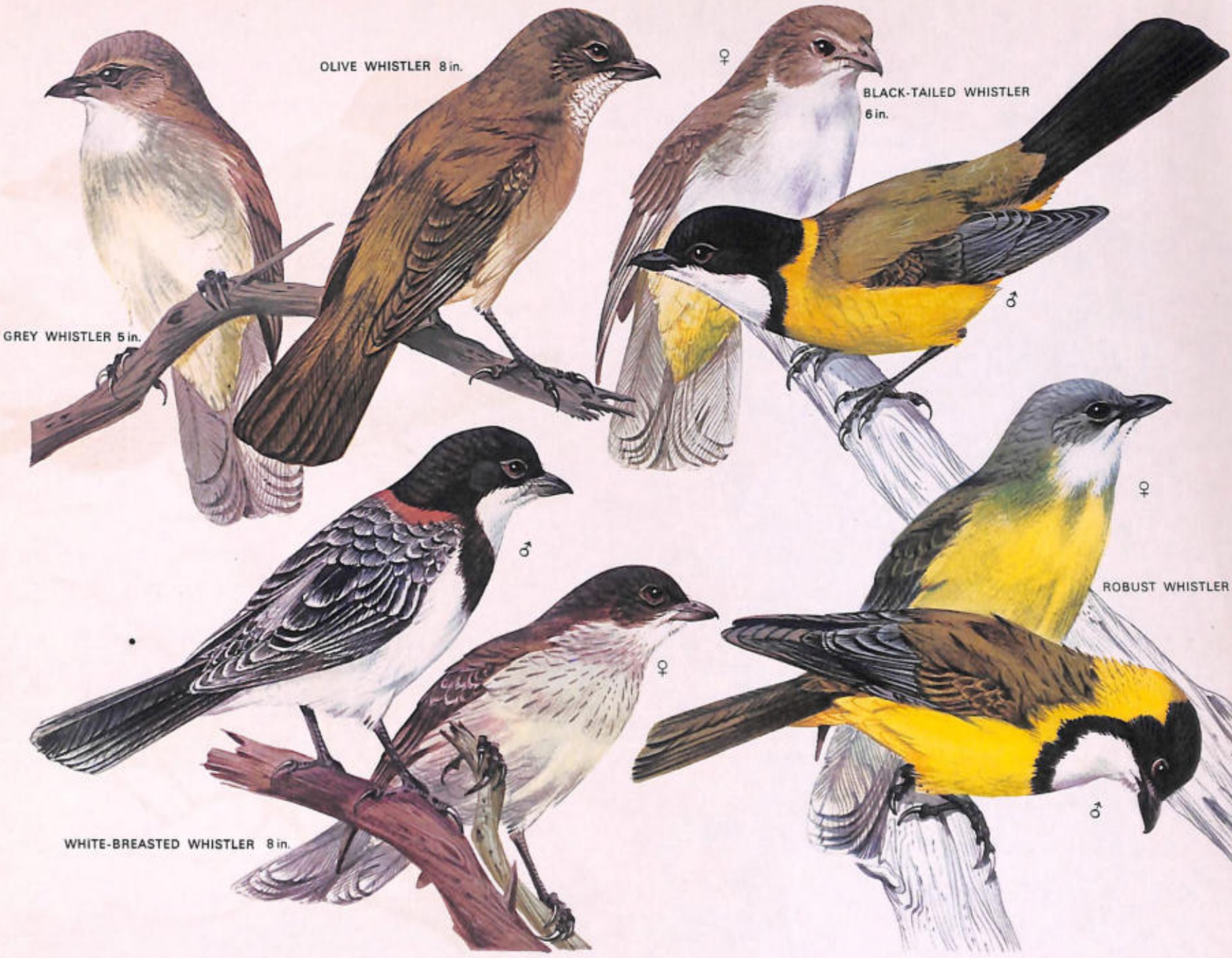
The Willie Wagtail, *Rhipidura leucophrys*, is no doubt the best-known member of this genus, and its vernacular name is an indication of the fond familiarity with which people regard the bird. It is found in most parts of Australia, but is a rare bird in Tasmania, where its presence is considered to be accidental. Outside Australia this species is found in New Guinea and a number of other tropical islands.

The favoured habitats of this species appear to be fairly open areas, such as partly cleared farm-land, lightly timbered park-like country and the growth bordering water-courses. This Wagtail is frequently within the vicinity of water, but there are at least some records of the bird in arid areas; for instance, they have been recorded in dry country three hundred miles north-west of Alice Springs.

The Wagtail has become exceptionally tame, and appears to have profited by the spread of cultivation in Australia; forest clearing is opening up new territory for the bird. In gardens and parks they are a familiar sight and they will frequently nest under verandahs or in shrubs growing close to a building.

These little birds often associate themselves with grazing stock, and perch upon their backs to await insects. In the tropical north of Australia they have been recorded as perching on the backs of crocodiles and even hopping into the saurian's open mouths to pick amongst the teeth for pieces of meat. Wagtails are vociferous, and their chief song is rendered as a rapid 'sweet-pretty-little-creature'. This song is frequently heard at night and especially on moonlit nights. They will also sit and sing for a long time in a tree lit by a street lamp.

The alarm call is a strange harsh chattering, not unlike the rattle of a half-empty matchbox. It is interesting that in the north of Australia the song and call of the bird is rather less developed, a trait which the Wagtail shares with various other north/south species. Wagtails are also notice-




ably smaller in the north. In New Guinea, the Solomons, and other northern islands, the wagtail's voice is scarcely to be recognized.

The diet of Wagtails is insects, most of which are caught in the air, although the bird also flits about on the ground snapping up small low-flying insects.

The nest is a beautifully constructed cup of grass and other vegetable-fibres strongly bound and felted together with spider-webbing. It is usually built on to a thin horizontal branch. There is a frequent nesting relationship between the Wagtail and the Mudlark, with the mud-nest builder occupying some high limb and the Wagtail building on a lower branch of the same tree or one very close by. A similar association is sometimes recorded between the Wagtail and the Restless Flycatcher.

Three, or sometimes four, eggs form a clutch, and these are greyish or a creamy colour, becoming darker as incubation proceeds. The brownish markings often form a zone at the larger end.

The breeding season extends from August to December and the birds may raise up to four broods in the one season. The juvenile birds are nurtured by their parents until just before, or at the hatching of, the next brood.

Grey Fantails, *R. fuliginosa*, are another widely-distributed species, and familiar to many people. In suitable habitats they are found in most parts of the continent and Tasmania. Outside Australia they also occur in New Zealand, New Caledonia and the New Hebrides. In some parts of their range these birds are nomadic, dispersing in the winter months from their breeding grounds.

This species is even more erratic in its movements than the Wagtail. Whilst perched, it is constantly pivoting its body about, fanning and closing its tail and being generally restless. This fantail spends a good deal of its time in the air in pursuit of insects, in short but frequent flights. As it flies the little bird throws itself about as rapidly as the eye can follow: twisting and banking, up and down, doubling back on itself and performing quaint evolutions of all kinds.

The song has a delicate yet vigorous twittering quality. These fantails sing when disturbed, and if intruded upon at the nest, they fly about one's head, singing, and now and then perching in their nest, still twittering as they do so. If disturbed at their nesting before the eggs are laid, or before incubation is well advanced, these birds will readily desert the nest (Serventy and Whittell, and the present author's own observations).

A neat, cup-shaped nest is built, from the bottom of which depends a long tail, shaped like a wineglass without a base, which gives the nest a very graceful appearance. It is constructed of plant-fibres firmly felted together with spider-webs. Both birds assist in the building of the nest and the rearing of the young.

The usual building-site is a thin branch, occasionally over water, and at heights from a few feet to perhaps sixty

feet above the ground, but usually low. Two or three eggs are laid which are white or buff-coloured with brownish and lavender spots, often forming a zone about the larger end. The breeding season is from September to December.

The Northern Fantail, *R. setosa*, is found in tropical northern Australia; outside the continent it also inhabits New Guinea and the Bismarck Archipelago.

This fantail is similar in its habits to the Grey Fantail. They have a similar restless nature and capture their insect prey in short erratic flights from a perch. These northern birds, however, are considerably less active than the southern species. The song is a delicate twittering but quite distinguishable in the field from that of the other fantails.

A cup-shaped nest is built, of plant-fibres and thin strips of ti-tree bark, with the outside covered and felted together with cobwebs. Hanging from the underside of the nest is a tail, like the stem of a wineglass, which is usually about two inches long. A thin, horizontal branch is the normal site, and the nest may be built at various heights up to fifty feet from the ground.

Two creamy-white eggs are laid which have brownish speckling, often forming a zone about the larger end. The breeding season is from October to January.

The Rufous Fantail, *R. rufifrons*, is a migrant species on the whole. They are found throughout most of eastern Australia at various seasons but are rarely seen as far west as south-eastern South Australia although they have been found nesting just over the border. There is only one record for Tasmania (Sharland, 1958).

The first Rufous Fantails arrive in south-eastern Australia during September and by October the migration is in full swing. In late February the northward movement begins, and few of these fantails remain by the end of April. In a mild year, some birds remain south throughout the winter, in which case they generally haunt open-forest country.

The migrating birds winter in the north-east of Australia, and it may yet be proved that some cross over to New Guinea and back each year. The breeding habitat of these little fantails is dense cover, such as ferny gullies, thickly forested mountain slopes and rain-forest.

They are pretty birds, and as they flit about catching insects in sunny clearings, their rump and upper tail glow a foxy red. The song is a delicate twittering and lisping trill. These birds have similarly erratic habits, both while perched and flying, to the other fantails.

The nest is shaped like a wineglass, with the 'stem' varying in length. The cup-shaped structure is very neatly built on to a thin twig or two, at heights from a few feet to thirty or more.

Two, or sometimes three, eggs are laid which are buff-coloured with a zone of brown and lavender spots about the larger end. The breeding season in the south-east, extends from October to February, with the height of the season from November to January.

### *Pachycephalinae*

This sub-family contains the ten Australian whistlers, a group of thrush-like birds with fine calls. This number is reduced by some ornithologists who consider some of the ten to be forms, and not full species. Australia and New Guinea are the headquarters of this group, but they also range northwards to Malaya and the Philippines, and eastwards through many of the South Pacific islands.

As a group, the whistlers tend to be inhabitants of scrub and forest. Out of the breeding season they may be found in groups, often in company with other birds, wandering through the forests in their quest for food, and solitary birds can also be seen. During the breeding season, however, whistlers tend to be strongly territory conscious.

The Golden Whistler, one of the most common in Australia, has the distinction of being divided into seventy or eighty sub-species over its full range; which is more than any other bird in the world.

The plumage differs between the sexes in most species of whistler, the male being brighter. In some cases the immature males, in 'female' garb, have been known to breed.

The Olive Whistler, *Pachycephala olivacea*, is found from south-eastern Queensland to Victoria and south-east South Australia. This bird is also quite common on the islands of Bass Strait and in Tasmania.

These whistlers are birds of the big scrub and forested ranges in the main, but they also penetrate to coastal areas where there is plenty of cover.

They are fairly retiring birds, but will gradually become tamer if in frequent contact with humans, for example, in national parks. Olive Whistlers are also inquisitive and can be called up with a thin, squeaky whistling call.

Their call-notes are very melodious, but have a kind of echoing wistfulness which is difficult to describe. One call, recorded for Queensland birds is 'pee-ooo'. 'Cher-weet' and 'whip-of-will' are other interpretations of southern calls.

These birds spend a good deal of their time upon the ground and hopping about in the branches of low scrub. They thus cover a good deal of territory without flying, in their hunt for insects. Their insectivorous diet is varied by grubs, spiders and a few seeds.

The nest is a rather loosely-constructed collection of twigs, dead leaves and long straggly pieces of bark, which is lined with finer material such as rootlets. As Sharland says in *Tasmanian Birds*, it could easily be mistaken for natural debris. It is usually built into the upright forked branch of a bush or in a clump of vines. They are bold birds on the nest, and when brooding, will sometimes allow a very close approach before flying off.

Two or three pale, yellowish-white eggs are laid which have markings of dull grey and brown. The breeding season is from September to January.

The Golden Whistler, *P. pectoralis*, is the most showy member of the genus, in a livery of gold, green, black and white. The female, as with all the whistlers, is a much more soberly-coloured bird.

The Golden Whistler ranges through eastern and south-eastern Australia from the middle of Queensland to the Eyre Peninsula in South Australia. There is a separate population in south-west Australia and they are also common in Tasmania.

These are birds of the scrub and open forest, where they may be seen in pairs in the breeding season and singly, or in loose wandering groups, in the winter. During the winter they tend to move out into more open country. They are often seen in suburban gardens in such cities as Melbourne, Sydney and Hamilton.

Golden Whistlers have strong voices and a variety of notes, with the males singing a good deal during the breeding season. Various calls have been rendered as 'wi-wi-wi-wit' with the stress on the last syllable, and 'witee-chew-ee'. There is also a single loud, almost whip-like whistle.

The food of these birds is insects, grubs and similar creatures, garnered in low foliage and from the ground. When I have been camping in the bush I have found that Golden and Olive Whistlers are amongst the many species that are bold enough to come hopping into one's tent in

search of cheese and bread-crumbs.

Golden Whistlers build a shallow cup-nest of grass, shredded bark, rootlets and similar materials, which is usually placed in the upright fork of a low bush. Both birds assist in the nest-building and in the incubation, and later, in rearing the young.

Two, or sometimes three, eggs are laid; these are stone-coloured to white, or sometimes pale salmon, speckled with brown and grey. The markings often form a zone around the larger end. Breeding takes place from August to December.

The Rufous Whistler, *P. rufiventris*, is found in many parts of Australia, where suitable open-wooded country allows. In some places this bird is spreading into areas of deforestation, where the Golden Whistler is decreasing from the same cause.

In the eastern parts of the continent the birds are nomadic, moving into more open country. There are also reports of the species being migratory to some extent, moving south in the spring to breed and returning northwards at the end of summer and beginning of autumn. Many Rufous Whistlers do, however, remain south all the year. In the west, Rufous Whistlers definitely do not migrate, but some of them appear to be nomadic in winter. Other male birds in the west will defend a territory throughout the year with vigorous singing.

They are fairly common and their loud and joyous song is one of the most pleasant spring and summer sounds. In the spring the song of the whistler develops, and the familiar 'e-chong', a kind of musical whip-crack, rings through the woods. There is also a long whistling, rippling song added to this call, the male bird often indulging in a display of bowing as he sings. The autumn song of the Rufous Whistler is more mellow, and is considered by some observers to be more beautiful.

A fairly fragile nest is constructed, of dead twigs, grass and rootlets, and is lined with finer materials. This nest is so loosely made that the eggs can sometimes be seen from below. It is usually placed in the upright forks of a branch in a tree or bush at any height up to twenty feet or so from the ground.

Two or three olive eggs are laid, spotted and blotched with darker browns. Territories may be taken up as early as July or August in some localities but the height of the breeding season is from September to December and January.

The Buff-breasted Whistler, *P. rufogularis*, is a bird of the mallee country, restricted in its range to north-western Victoria, south-eastern South Australia and south-western N.S.W. It was not recorded from the latter state until 1963, when a number of pairs were found breeding in a reserve between Griffith and Rankin Springs.

The most favoured habitat of these birds appears to be the areas of 'whipstick scrub' found within the mallee areas. This scrub is fairly thick and made up principally of broombrush and *Leptospermum*.

The song and calls of this species are very melodious and have a somewhat wistful air. The calls are also ventriloquial. The main call of the Buff-breasted Whistler is a loud clear whistle followed immediately by a note 'resembling that made by the drawing-in of breath between partly closed lips'.

Various grubs, beetles, grasshoppers and other insects form this whistler's diet, much of which is procured upon the ground. The birds have also been noticed eating small berries.

A rather substantial nest is built, usually quite close to the ground. It is constructed mainly of strips of bark, with a few grasses, rootlets and similar materials on a base of twigs. Typical sites for the nest are in a low bush, a tussock of porcupine-grass or in growth trailing over a fallen trunk or bough.

Two or three eggs are laid which are a light buff or creamy colour, spotted with browns and lavender which often form a zone about the larger end. The breeding season is from about September to December.

The Gilbert Whistler, *P. inornata*, is found in mallee scrub and various open-forest areas from western N.S.W. and central Victoria to inland south-western Australia. It is rarely observed near the coast.

Usually in pairs, these subtly-coloured birds inhabit the fairly dry scrub, mallee in particular, spending much of their time on the ground in their quest for grubs, beetles and other insects. Not a great deal of observation has been made on this bird, but its habits are probably similar to those of the foregoing species, which inhabits much the same country, except that it prefers bigger timber than the Buff-breasted bird does, and has a more pleasant song.

A variety of rich notes are recorded for this bird, and some of the calls are inclined to be ventriloquial. One whistle of the species is said to resemble a man calling up a dog, and is rendered 'wi-wi-wi-wit' with the accent on the last note. Another call has been described as a 'chuckling "chop-chop" note'.

A cup-shaped nest is built, of dry bark and a few rootlets. This is usually placed in a low scrubby bush and sometimes the old nest of a babbler is used as a base.

Two or three eggs are laid which are a creamy-buff, spotted with darker browns. They are similar to the eggs of the Buff-breasted Whistler, but smaller. The breeding season is from September to December.

The Robust Whistler, *P. robusta*, is a tropical, northern Australian bird, found from Parry Harbour in Western Australia to northern Queensland.

This whistler is chiefly a bird of the coastal ranges where it frequents different types of forest country; it is also found on various scrub-covered islands lying off-shore. It is a permanent resident within its range. Not a great deal has been recorded of this remote species, but its notes are similar to those of the other yellow-breasted species of whistler. It may prove that their habits accord also. The diet of the Robust Whistler is insects.

A nest of rootlets and other fairly light material is built and the whole is bound together with spider-webs. It is usually built into the upright fork of a small tree or bush.

Two or three typical whistler eggs are laid: these are stone or buff-coloured and spotted with darker shades of brown. The breeding season is from October to December.

The Black-tailed Whistler, *P. melanura*, is confined to north-western Australia. It ranges from the area of Exmouth Gulf north to Derby and perhaps beyond. This whistler is considered by a number of Australian ornithologists to be only a form or northern race of the Golden Whistler. The range of the two birds is separated by a large area, as the Golden Whistler, in Western Australia, does not penetrate higher than about the Murchison River.

In the field, the bird closely resembles the Robust Whistler, although the females are distinctive. Their calls are also similar. So far as is known, their habits are similar to those of the other Yellow-breasted Whistlers. Its favoured haunts are the mangrove swamps and more rarely the contiguous scrub areas.

An open cup-nest is built, of rootlets, and lined with finer material. The outside of the nest is bound together with

a light covering of spider-webs. The usual building-site is the upright fork of a mangrove branch.

Two whitish eggs form a full clutch and these are spotted with chestnut and lavender, and heavily zoned around the larger end. The breeding season is from October to December.

Another whistler inhabiting the mangroves is the Brown Whistler, *P. simplex*, a very plain, dusky-brown bird. The range of this species is along the coast of the Northern Territory, from Port Keats to the Roper River.

This is a retiring bird, living in the mangroves and contiguous swamps and scrub. Not very much has been recorded of its habits, but it is said to have a soft pleasing song—a remark that might be made about any of the *Pachycephalidae*. Also, like the other whistlers, its diet consists of insects of various kinds.

A nest of coarse grasses is built and this is usually lined with the seed-tops of the grasses. The upright fork of a mangrove is the usual site. Two pale buff eggs form the clutch, and these have spots of dark brown over lilac markings. The breeding season has not been recorded by the collectors of the eggs.

The White-breasted Whistler, *P. lanioides*, is another northern species that has been little studied. They range along coastal northern Australia from Carnarvon in Western Australia to the Gulf of Carpentaria.

They are mangrove-frequenting birds, and are usually seen in pairs. F. Lawson Whitlock, the ornithologist, found that although the male sings, defending the territory close by the nest, he takes no part in its construction nor in the raising of the young.

The main call is a loud clear whistle not unlike that of the Grey Thrush, and the male's alarm note is a sharp, harsh call. The full song of the male is a loud and musical whistling, which has a sense of joy and abandon.

A rather flat, and insubstantial nest is built, of rootlets and fine twigs. It is placed in a forked branch in the middle of a mangrove tree and is at heights from a few feet up to fifteen feet or so.

Two stone or buff-coloured eggs are laid, and these are spotted with umber and lavender and zoned at the larger end. The breeding season is at various times of the year. November to January is given but occupied nests have also been found in August.

The Grey Whistler, *P. griseiceps*, is found in north-eastern and the central coastal areas of Queensland. This species is also a native of New Guinea and the Aru Islands.

This plainly-coloured whistler is a bird of the great rain-forests, where it lives amongst the soaring trunks and vine-laden branches. Unlike many of the other whistlers, this species shows little tendency to spend time upon the ground. The outer foliage of the largest trees, and the tangles of vine, are its haunts. Here the bird captures the beetles, flys and other insects which make up its diet.

The species has a loud and clear whistling song and it also utters a call of two short notes.

A loosely-built, cup-shaped nest is constructed of plant-fibres, dead leaves and rootlets. This is all interwoven with vine-tendrils and sparsely lined with dry grass and vine-tendrils. Although much of the bird's time appears to be spent high in the tree-tops, the nest is usually built into the upright fork of a sapling.

Two white eggs are laid which are marked with numerous spots of dark and light umber and purplish-grey. The recorded breeding season is from October to December.

*Monarchinae*

The sub-family, *Monarchinae*, contains half-a-dozen or so species, depending on one's taxonomic views or sources of reference. As discussed in the introduction to this family, the species to be dealt with present some difficult problems of classification. It is not the place of a book such as this to promulgate taxonomic theories, so I have followed the same system of classification with these birds that I have used throughout this work. No doubt, this will not accord with the views on flycatchers of some Australian ornithologists.

The Restless Flycatcher, *Seisura inquieta*, is almost as familiar a bird in many places as the Willie Wagtail. It is rather similar in colour and pattern to the Wagtail, but may immediately be distinguished by its lack of black throat and bib.

The Restless Flycatcher is found throughout much of the continent, although it is rare in the arid centre. This bird does not appear to have suffered from the encroachment of man; perhaps the contrary may be the case, as it thrives in open, lightly timbered country such as farm-land, where there are creeks, dams and swamps.

They are confiding little birds, and will often visit gardens in country areas, and hunt for insects around houses and farm buildings. The most familiar call of this species is a loud 'pee-pee-pee'. They also have a distinctive churring or grinding call; so metallic is this sound that it has earned for the birds the nick-name 'Scissors-grinder'. When uttering this call the bird is usually hovering near the ground. With its body arched and its wings beating rapidly, the little bird churrs out its strange call. It will also occasionally give vent to this same call when perched.

A neat cup-nest is built, of plant-fibres bound and felted together with spider-webs. On the outside it is decorated

and camouflaged with lichen. Sometimes it is lined with feathers, but often with hair. It is placed on a thin branch, and the usual height is about twenty to thirty feet; but the bird may build as low as four feet, or as high as sixty feet.

There is a frequent nesting-relationship between this species and other black and white birds—usually Mudlarks or Willie Wagtails—the flycatcher building in the same tree or one very close by. Sometimes all three may be found nesting in proximity.

Three or four white or buff eggs are laid, speckled with browns and lavender; the markings often form a zone around the large end of the egg. The breeding season is from August to December.

The next genus, the nominate *Monarcha*, contains four species of rather strikingly-coloured birds. The Black-faced Flycatcher, *Monarcha melanopsis*, is found all the way down eastern Australia, from Cape York to the vicinity of Melbourne. It is also found in New Guinea.

It is a migrant to the southern part of Australia, arriving to breed in the spring and returning northwards in February and March to escape the colder weather and consequent lack of insect-food.

They are very active birds, and may be seen rapidly moving about the branches and foliage of trees for insects. They also indulge in short and rapid aerial pursuits of their prey. Their chief call is a loud, whistling,'why-chew why-chew', a pleasant and lively sound to hear each spring in the south as the birds return.

A cup-shaped nest is built, of soft green mosses and lined with fine rootlets and sometimes a little hair. The common site is the upright fork of a branch usually at no great height, but occasionally up to thirty feet from the ground.

Two or three white eggs form the clutch, and these are spotted with reddish and lavender spots. The breeding season is from November to January.

The Pearly Flycatcher, *M. frater*, somewhat resembles the foregoing species, but it is only found in north-eastern Queensland, from Cape York to the Claudie River district.

Usually to be seen in pairs, these handsome flycatchers inhabit both open forest and thicker jungles. In the jungles they may be seen hawking for insects from perches on the edges of clearings.

The nest is made of fine strips and flakes of paper-bark which is bound together with cobwebs and lined with fine vegetable-down and fibre. Three white eggs are laid which have small reddish-brown spots over lavender markings. The breeding season is recorded as November to January.

The Spectacled Flycatcher, *M. trivirgata*, is also an eastern Australian species, found from Cape York south to near Sydney, and perhaps occasionally south of that city. Outside the continent this species also inhabits New Guinea, Timor and the Molucca Islands.

This richly-coloured flycatcher is a migrant, moving south during September and departing in February and March after breeding. A whirring or softer trilling 'prree-prree-prree', uttered frequently, is heard throughout its stay in the south.

They have the true flycatcher habit of pursuing insects in mid-air. The birds take up a position on a projecting branch as insects come within range. They also capture a few insects in the foliage of the trees.

A cup-shaped nest is built, of bark-strips and moss, and lined with various soft materials. The outside of the nest is bound with cobwebs and decorated (and thus camouflaged) with cocoons and moss. It is usually built neatly into the upright fork of a low branch or between the stems of a thick hanging vine.

Two dull-white eggs are laid which have reddish-brown or purple markings. The breeding season is from October to January.

The White-eared Flycatcher, *M. leucotis*, looks quite different from the other birds in this genus, being boldly patterned in black and white. It is found from Cape York down to south-eastern Queensland into N.S.W.

Like quite a number of our northern species, not a great deal has been recorded about the habits or life-history of this flycatcher. It is a very active bird, catching most of its food on the wing. The bird's diet is insects, and it has the habit of hovering, to pick insects off the foliage of the high rain-forest trees. The call most frequently heard from these birds is noted as 'ta-ta-taaaa'.

A cup-shaped nest is constructed, of moss and spiders' cocoons, felted together with cobwebs and lined with fine vegetable-fibres. Usually, it is placed in the fork of a low bush at from about five to ten feet from the ground. Two whitish eggs are laid with small spots of reddish-brown. The nesting season does not appear to have been recorded by the egg-collectors.

The genus *Myiagra*, contains three species of flycatcher, two of which are migrants, the third appearing to be a stationary species.

The Satin Flycatcher, *Myiagra cyanoleuca*, is the most handsome of this genus, with its beautiful dark satin blue colouring on the upper parts, head and chest.

These birds inhabit eastern Australia, penetrating only into the south-eastern corner of South Australia. They are also common in Tasmania. During September, these migrant flycatchers arrive in the south to breed. After this

they drift northwards again, gradually departing throughout February, March and April.

The tall forest country of the Great Dividing Range and similar high country is their favoured habitat and they have been recorded in areas up to 5,000 feet.

They are active little birds, and quite vociferous; a number of them will make the forest quite noisy with their 'chrree-chrree-chrree' high, frog-like calls. They have the habit of shaking and elevating their tails and raising the nape-feathers into a low crest as they hop about the branches.

This flycatcher lives entirely on insects, which are usually caught as the bird hops and flits about the high branches.

This species will sometimes nest in large communities; as many as nine nests have been found within a limited area. The nesting-site is frequently a dead branch immediately under the shelter of another limb and often at a considerable height. A pretty nest of thin bark-strips is built, with a lining of fine bark-fibres and thin rootlets and sometimes a few feathers. The nest is bound together with cobwebs which also attach it to the branch. The same pair of birds will often come back to the one locality each year, and there are records of them building on exactly the same spot on a branch. Both sexes share the tasks of incubation and rearing the young.

Three eggs is the normal clutch and these are dull white to greenish-white, spotted with brown and lavender, chiefly in a zone about the larger end. The main breeding period is from November to January.

The Leaden Flycatcher, *M. rubecula*, is a somewhat similar-looking bird to the above species but lacks the satiny gleam of the upper parts. These birds range from north-western Australia, across the Northern Territory and down through the eastern states to Victoria. They are considered to be but stragglers to South Australia and Tasmania. Outside the continent, Leaden Flycatchers also inhabit New Guinea.

Interstate migrants, these active little birds arrive in the south-east during March and April. They frequent open bushland and are, in the main, a coastal species.

Attention is drawn to them by their slow, clear whistling call. This may be rendered as 'too-whee' or as a rising scale. As the bird calls, or when excited in some other way, it shakes and trembles its tail in a very distinctive manner. In some districts the bird has come to be known as the 'Frog-bird' because of another of its calls, which is a slightly frog-like grating sound.

The food of Leaden Flycatchers is insects, chiefly flying ones, which the birds pursue in mid-air, dashing out and back from favourite perches. A good deal of their food is also procured from within the canopy of the trees and off the high foliage.

A neat cup-shaped nest is built, of fine strips of bark and other plant-fibres. The nest is lined with fine rootlets and matted together on the outside with cobwebs; it may also be decorated with flakes of bark and lichen.

The usual site is on top of a small dead branch, and sometimes a site with a sheltering limb overhead is chosen. Nesting may take place at a considerable height or as low as five feet from the ground. Three white or pale bluish-white eggs are laid which are spotted with browns and lavender. The breeding season is from October to January.

The Broad-billed Flycatcher, *M. ruficollis*, is confined to the northern, coastal districts of the continent. Its range is from the Kimberleys to north-eastern Queensland. Outside Australia this bird is also found in New Guinea, Timor and the Aru Islands.

In the main, this is a species of the mangrove swamps and the contiguous scrub. Usually living in pairs, these birds may be seen darting and hopping about the foliage, in search of insects. Not a great deal, however, seems to have been published about their habits.

A neat, cup-shaped nest of bark-strips is built, and this is usually placed on a small dead branch a couple of feet above the high-water mark. The nest is lined with fine plant-fibres, bound together with spider-webs and decorated on the outside with lichens.

Two whitish eggs are laid and these have spots of brown and lavender, usually about the larger end. The breeding season is from November to February.

The genus *Arses*, contains two flycatchers of the brush and big scrub areas. They are both patterned boldly in black and white and are able to elevate their nape-feathers into a considerable crest or ruff.

The Pied Flycatcher, *Arses kaupi*, is confined to Northern Queensland, from Cooktown to Cardwell. This handsome species is very active, hopping and fluttering about in the tall forest trees. Much of its time is spent searching the bark of trunks and limbs, in search of insects and spiders living in crevices. As the birds move about, they frequently spread their tails and erect their head and nape feathers.

The nest is quite unlike those of the other species of flycatcher, and more resembles that of some honeyeaters. A small basket or hammock-shaped nest is built, and slung between the horizontal tendrils of a vine or twigs. It is composed of fine fern stalks and plant-tendrils, bound up with spider-webs and decorated on the outside with lichens. The usual sites are about thirty feet from the ground.

Two whitish eggs are laid, spotted with reddish and lavender markings. The breeding season is from November to January.

The Frill-necked Flycatcher, *A. lorealis*, is also a northern Queensland bird, being found from Cape York down to the area of the Rocky River and Cardwell.

This species inhabits dense scrub and forest areas and little has been recorded of the birds' habits. So far as is known, they appear to lead similar lives to the Pied Flycatchers—actively moving about in the high foliage and making short flights in pursuit of aerial insects.

The nest, eggs and breeding season, also closely resemble those of the preceding species.

The last Australian flycatcher is difficult to place in its relationships with other flycatchers and other birds. This species, the Boat-billed Flycatcher, is discussed more fully in the introduction to the *Muscicapidae*. For the sake of convenience, and because I can find no deciding weight of published opinion on its position, it is placed here on its own.

The Boat-billed Flycatcher, *Machaerirhynchus flaviventer*, appears to be confined to coastal northern Queensland from Cape York down to Cardwell, although there is one record from near Brisbane.

This species inhabits the deep rain-forests of the coastal areas. They have a pleasantly trilling 'flycatcher-song' which is often uttered and particularly in the breeding season.

Boat-billed Flycatchers are constantly on the move, amongst the foliage and about the branches of the tall trees, where they catch their insect food. Flying insects are also caught, the birds making short erratic sallies from perches, in the manner of most flycatchers.

A fairly flat, saucer-shaped nest is built, of fine materials such as plant stalks, matted and bound together with cobwebs. The lining is of fine, dry tendrils, and the nest is built into a horizontally forked branch of a thick tree.

Two white eggs are laid which have a zone of purplish-red spots about the larger end. The breeding season is from September to December, so far as is known.

MASKED WOOD-SWALLOW 8 in.

WHITE-BREASTED WOOD-SWALLOW 7½ i

LITTLE WOOD-SWALLOW 6 in.

BLACK-FACED WOOD-SWALLOW 6 in.

DUSKY WOOD-SWALLOW
7½ in.

WHITE-BROWED WOOD-SWALLOW 8 in.

# MOTACILLIDAE
## Pipits

The name pipit is derived from the twittering voices of the family, of which there are fifty-four species in the world. The family includes the wagtails, *Motacillidae*, which are not represented in Australia (except by rare vagrants) and are quite unrelated to our muscicapid Willie Wagtail. Nor do they bear any relationship with the larks, although they do look similar superficially. The structure of the pipits, and their behaviour, actually suggests affinities with the thrushes and Old World warblers.

The pipit in Australia is a geographic race of Richard's Pipit, various races of which are found from eastern Europe through Africa and eastwards to China, Australia and New Zealand.

### PIPITS

The Pipit, *Anthus australis*, is generally distributed in open grassy country throughout the Australian continent and Tasmania.

Singly, in pairs, or in scattered winter flocks, the Australian Pipit is found in most grassy habitats from mountain slopes to the sea-shore. They are active birds, walking and running through the grass in pursuit of insects

they drift northwards again, gradually departing throughout February, March and April.

The tall forest country of the Great Dividing Range and similar high country is their favoured habitat and they have been recorded in areas up to 5,000 feet.

They are active little birds, and quite vociferous; a number of them will make the forest quite noisy with their 'chrree-chrree-chrree' high, frog-like calls. They have the habit of shaking and elevating their tails and raising the nape-feathers into a low crest as they hop about the branches.

This flycatcher lives entirely on insects, which are usually caught as the bird hops and flits about the high branches.

This species will sometimes nest in large communities; as many as nine nests have been found within a limited area. The nesting-site is frequently a dead branch immediately under the shelter of another limb and often at a considerable height. A pretty nest of thin bark-strips is built, with a lining of fine bark-fibres and thin rootlets and sometimes a few feathers. The nest is bound together with cobwebs which also attach it to the branch. The same pair of birds will often come back to the one locality each year, and there are records of them building on exactly the same spot on a branch. Both sexes share the tasks of incubation and rearing the young.

Three eggs is the normal clutch and these are dull white to greenish-white, spotted with brown and lavender, chiefly in a zone about the larger end. The main breeding period is from November to January.

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Interstate migrants, these active little birds arrive in the south-east during March and April. They frequent open bushland and are, in the main, a coastal species.

Attention is drawn to them by their slow, clear whistling call. This may be rendered as 'too-whee' or as a rising scale. As the bird calls, or when excited in some other way, it shakes and trembles its tail in a very distinctive manner. In some districts the bird has come to be known as the'Frog-bird' because of another of its calls, which is a slightly frog-like grating sound.

The food of Leaden Flycatchers is insects, chiefly flying ones, which the birds pursue in mid-air, dashing out and back from favourite perches. A good deal of their food is also procured from within the canopy of the trees and off the high foliage.

A neat cup-shaped nest is built, of fine strips of bark and other plant-fibres. The nest is lined with fine rootlets and matted together on the outside with cobwebs; it may also be decorated with flakes of bark and lichen.

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Boat-billed Flycatchers are constantly on the move, amongst the foliage and about the branches of the tall trees, where they catch their insect food. Flying insects are also caught, the birds making short erratic sallies from perches, in the manner of most flycatchers.

A fairly flat, saucer-shaped nest is built, of fine materials such as plant stalks, matted and bound together with cobwebs. The lining is of fine, dry tendrils, and the nest is built into a horizontally forked branch of a thick tree.

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Singly, in pairs, or in scattered winter flocks, the Australian Pipit is found in most grassy habitats from mountain slopes to the sea-shore. They are active birds, walking and running through the grass in pursuit of insects

and in search of seeds. If a pipit is disturbed, it usually runs off, stopping frequently with its head up, to view the intruder. If pressed, however, it will rise and fly a short distance, dipping and rising as it goes.

Now and then, pipits may be seen perched on a fence-post or a dead branch, from which they will sing their rather twittering warble. It appears that this habit of perching up relatively high is more common in the west of Australia than the east. In the eastern states nevertheless, I have frequently seen pipits perching on boulders, flicking their tails and giving what sounds like an enquiring twitter.

In some localities they are rather nomadic, disappearing suddenly from a distict where they have been common, and not being seen there again for months. Some observers suggest that shorter-grassed country is preferred, and the pipits will move away from grass that springs up after rains.

A cup-shaped nest of grasses is built. This is usually situated in or under the shelter of a tussock. Nests are also found occasionally under the sheltering bulge of a rock or beneath a thick low bush.

Three or four eggs are laid which are greyish-white, speckled with pale brown and slate-grey. The breeding season is from August to January.

## ARTAMIDAE

### Wood-swallows

Of the ten species of wood-swallows in the world, there are six in Australia. The others are found from India down through the Philippines and eastwards to the Fiji Islands.

Although these birds obtain most of their food on the wing rather in the manner of swallows, they are in no way related to them. Their hunting method is actually quite different. Swallows pursue their prey in rapid sustained flight, whereas the *Artamidae* return to a perch between each banking, gliding pursuit of a flying insect. It has been noted that during a dearth of flying insects, wood-swallows will feed on ground insects and larvae (*Birds of the World*, Oliver Austin).

As a rule, the wood-swallows are gregarious birds; they often flock during the day, and at night roost together, huddled tightly along a bough. In bad weather they will try to take shelter, and will sometimes pack themselves on top of each other into a small space, such as the hollow of a tree or behind a loose slab of bark.

### WOOD-SWALLOWS

The White-breasted Wood-swallow, *Artamus leucorhynchus*, is found from Shark Bay in Western Australia, around the top of the continent and down the eastern states to Victoria and eastern South Australia. It has also been recorded occasionally from Tasmania and some Bass Strait islands. Outside Australia, this species also inhabits some islands of the West Pacific.

These wood-swallows usually frequent lightly timbered country near water. It is both a coastal species and a bird of the sub-interior waterways. In the north and west they are often found in the mangroves. They appear to have a slight association with the Mudlark, and the old nests of this bird are often used by the wood-swallows.

Most of the insect-food is taken in the air; the bird flying out from a perch to capture passing insects.

If an old nest of a mudlark is not utilised, a grass nest is built which is rather more substantial than those made by the other wood-swallows. This is placed in a high forked branch of a tree or in a hollow branch 'spout'. In some localities, notably north-east Queensland, the bird associates freely with human habitation, and builds in such places as trees, lining busy streets.



Three or four eggs are laid which are a creamy-white, spotted pale brown and light blue-grey. The breeding season is from August to January.

The Black-faced Wood-swallow, *A. cinereus*, is a species of the interior and sub-interior. In the western parts of its range and in the north, it also extends to coastal districts.

In the south-west of Australia it is increasing its range as the wheat belt is extended. The general habitat of this wood-swallow is lightly timbered and rather more open country, than that preferred by some other members of the family. It is a stationary species as a rule, and may be seen in pairs or in small flocks.

An open cup-shaped nest is built, of small twigs, plant stems and rootlets, and lined with finer materials such as grass and occasionally horse-hair. It is usually placed in a low bush or a stump.

Four eggs is the usual clutch, and these are fleshy-white, spotted with umber over bluish-grey. The breeding season is given as September to January in various localities, although these wood-swallows will breed at any time of the year after rain, and show a very ready response in this manner, to rainfall.

The Masked Wood-swallow, *A. personatus*, is also a bird of the interior, found generally throughout the continent except for Cape York and the jarrah forest and coastal plain areas in the extreme south of Western Australia.

It may be seen in small numbers in some coastal districts and has been reported in very large flocks in the Kimberleys and Central Australia. This species is a nomad moving within the continent, and the birds arrive in the south in spasmodic numbers. In some years only a few might appear in a locality where, in previous seasons, they have been common. When they do arrive in the south-east it is during September and October. Much earlier influxes have been noted in the west, some birds for example, coming south in August, breeding and departing again by November.

The Masked Wood-swallows hunt for flying insects in a manner similar to their relatives. Perched on a high, exposed branch the birds await a passing insect. They launch off in short wheeling and gliding flights and return to their perch between sallies. The call is a chirruping sound and the alarm note a harsh slurring call.

A cup-shaped nest, of twigs and grass, is built. This may be placed in a bush, on top of a stump or even on a fence-post, and is not usually higher than about twenty feet from the ground.

Two or three greyish-white to light greenish-grey eggs form the clutch. They are marked with browns and spots of pale grey. The breeding season varies, but is usually some time between August and January; early nesters will sometimes raise two broods.

The White-browed Wood-swallow, *A. superciliosus*, is found in most parts of Australia where the habitat permits. It does not occur in Cape York or in Western Australia south of the Gascoyne River.

They inhabit lightly timbered country and open forest of various kinds, mostly in small flocks. In eastern Australia they are quite a common species but in Western Australia they occur in less numbers and only in parts of the interior and the Kimberleys. Quite often, mixed flocks of this species and the Masked Wood-swallow will be seen.

Their habits are typically 'wood-swallow'. The birds make flights of short duration, although sometimes quite high, in pursuit of insects. On the wing they are buoyant, and glide a good deal, and they may be heard uttering a chirruping call as they fly. If disturbed at the nest or alarmed in any way, these wood-swallows give a harsh, scolding call.

A slightly-built nest of sticks is made, intertwined with dry grasses. A variety of nest-sites are recorded, but it is usually in a forked branch or on a stump.

The two or three eggs laid are whitish to grey-green, spotted and blotched with pale brown over slate-grey markings. The breeding season is October to January.

The Little Wood-swallow, *A. minor*, is mainly a bird of the interior and sub-interior but reaches the coast in Queensland. It is distributed across the top of the continent, ranging as far south as the Murchison River in the west, and northern N.S.W. in the east. On rare occasions, Little Wood-swallows come as far south as northern Victoria and adjacent parts of South Australia.

In pairs or small flocks, these birds may be seen in open park-like country but are typically a species of rugged range areas. They are graceful, buoyant fliers and procure most of their insect food on the wing.

The nest is often placed on a ledge or in a cavity of a rock-face, but it may also be found in the end of a hollow limb, in a hollow trunk or on a stump. It is a loosely-built structure of twigs, dry leaves and rootlets.

Three dull white eggs are laid and these are blotched with browns over slate-grey. The breeding season is from October to January.

The Dusky Wood-swallow, *A. cyanopterus*, is found well south of the Tropic of Capricorn, and does not extend north of Shark Bay in Western Australia. This is the only wood-swallow common in Tasmania and the Bass Strait; it also inhabits Kangaroo Island. They are absent from Central Australia—through lack of their favourite habitat of well-wooded country.

They are nomadic birds, appearing rather spasmodically in the southern parts of their range. Large numbers are seen sometimes in areas where they have been rare, and the reverse also happens.

Dusky Wood-swallows are graceful fliers, and often fly high, hawking for insects above the timber. In the main, they tend to favour more heavily wooded country than some other wood-swallows do.

At night, they indulge in the typical wood-swallow habit of crowding together to roost, often in a tree-trunk hollow or behind loose sheets of bark. Their insect-diet is supplemented with nectar.

A loosely-built nest, of twigs and grasses, is constructed into the fork of a tree, on a tree-trunk supported by flaking pieces of bark or on a stump. The site may be from about four to forty feet above the ground.

Three or four creamy-white eggs are laid which are marked with shades of brown, black and grey. The breeding season is from September to January.

## STURNIDAE

### Starlings and Mynahs

The *Sturnidae* are a widespread group of birds containing one hundred and six species, with their greatest development in the Ethiopian and Oriental regions.

Their ancestry is uncertain, but starlings probably arose from some early thrush-like group. One of the earliest known fossils of a Passeriform bird is of a species intermediate between the starlings and the thrushes. It was discovered in France in deposits about fifty million years old. The name starling (little star) derives from the speckled appearance of the Common Starling when it has first moulted into autumn plumage.

Most starlings are gregarious and garrulous, and a number of species are very adept mimics, both of the human voice and a variety of other sounds

In Australia we have one native of the family, the Shining Starling in the genus *Aplonis*, which is a colony-nester; a not uncommon habit amongst starlings.

The Common Starling of Europe has been introduced into this country and so has the Common Mynah. The former species has become something of a pest in some areas; whereas the Mynah is generally regarded as useful in destroying insects, and in being something of a scavenger about cities.

### STARLINGS

The Shining Starling, *Aplonis metallica*, is a bird of the forest and big scrub areas. It is found in eastern Queensland, from Cape York down to Gladstone, and on some of our tropical islands.

It is a migratory species, although sometimes a few birds will remain all the year. Most of the birds arrive during August and after nesting depart again in March.

Shining Starlings gather into large flocks, and may be seen indulging in mass flights, wheeling back and forth, and making a continuously changing pattern against the sky like wind-blown smoke. In some localities the bird has even been called the 'Whirly-wind Bird', because of this habit.

The diet of this species is native fruits of many kinds, including wild nutmeg, from which they eat only the mace.

Their fruit-diet is varied with insects caught upon the ground.

These starlings breed in large colonies in tall trees; as many as three hundred pairs will build close together. The nests are fairly large, oval structures of vine-tendrils, lined with pieces of palm leaf and soft plant-fibres. They are suspended from the branches of trees, usually in or close by dense scrub near the forest.

Three or four pale bluish-white eggs are laid which have reddish-brown and purplish markings. The breeding season is from September to January.

The Common Starling, *Sturnus vulgaris*, has become widely distributed in Australia. It is found in Victoria, Tasmania, South Australia (as far west as Ooldea), and has spread north through N.S.W., to at least Innisfail in north-east Queensland.

These starlings were released in Victoria in 1861 and at subsequent times. They are a very adaptive species, and seem equally at home in cities or in country areas. In some districts they are quite beneficial, as they destroy numbers of noxious insects. But on the whole, they have become pests, as they frequently raid orchards and seedlings in freshly-sown paddocks. They are proliferative birds, and it seems likely that they will continue to spread and become even more of a nuisance unless some control is undertaken.

Like many starling species they are highly gregarious, especially in winter, when they may sometimes be seen in vast flocks. They feed on the ground or in trees. At dusk in particular, they indulge in rather spectacular massed wheeling flights before retiring for the night.

They have loud voices, and are given to mimicry, rendering the calls of various birds as well as a variety of other sounds. Most of their own notes are a series of clicking and wheezing whistles, but now and then one does manage to perform quite a song.

An untidy mass of straw, feathers, string, pieces of paper and similar material serve as a nest. This is placed in any kind of a hole or crevice that the bird can find. One of the arguments against the bird is that it usurps the nesting places of many more desirable species.

From five to seven eggs form a clutch, and these are a pale blue or sometimes almost white. Breeding takes place at odd times of the year, but mainly between September and January.

## MYNAHS

The Indian Mynah, *Acridotheres tristis*, is a very common bird in South-east Asia, and in Australia is spreading out from Adelaide, Melbourne and Sydney. Around Sydney it is encroaching noticeably on country areas. Mynahs are also found in portions of the Darling Downs, north-eastern Queensland and in northern Tasmania. In Queensland they have become common in the sugar-cane plantations.

The Mynah was introduced into Melbourne in 1862 and in subsequent years. In that city and wherever else it occurs, the bird is thriving, although not equalling the starling in numbers. It seems to be one of the few introduced species that has not become a nuisance. Its strange rolling 'sailor's-walk' and clucking, chuckling calls are a rather entertaining addition to suburban bird-life.

On the whole, these birds are considered to be quite useful, scavenging about the cities and suburbs and destroying insects in country areas. In 1883 a large number were trapped in Melbourne and released in Queensland, chiefly around Townsville and on the Herbert and Johnstone Rivers, in an effort to combat grasshoppers and cane-beetles.

The nest is an untidy collection of grass, straw and odd pieces of rubbish, built into any cavity the birds can discover or in thick vegetation: palm trees are a favourite nesting-site.

Four or five glossy, pale blue eggs are laid and although most mynahs breed during the spring and summer months, a nest containing eggs may be found at almost any time.

## MELIPHAGIDAE
Honeyeaters

There are one hundred and sixty species of honeyeaters and they are confined to Australia, New Zealand and the islands of the South-west Pacific. In Australia we have sixty-nine of these species, so they might be said to constitute our most characteristic family, sharing that distinction perhaps, with the parrots and cockatoos.

An interesting relationship exists between a number of Australian flowering-trees and shrubs and various species of honeyeater. The trees are what is called ornithophilous, which, quite literally means 'bird-loving': the tree being entirely dependent on birds (honeyeaters and a few other species) for cross-fertilization.

On the whole, the honeyeaters are loud-voiced birds. Some have very rich or sweet whistling notes whilst others, such as the wattle-birds, have extraordinarily loud and raucous calls. Most of them are vigorous on the wing and very active amongst the foliage and blossom, where they obtain their diet of honey, sometimes varied with insects.

Physically, they tend to be longish, rather streamlined birds. Most of them also have relatively long down-curved bills, adapted to probing into flowers for the nectar. Honeyeaters are also characterised by their extensive tongues, which have a brush-tip and the sides of which can be curled up to make a tube for sucking nectar.

Most of the honeyeaters build open cup-shaped nests of various kinds, which will be described for each species. It is worth noting, however, that the *Meliphagidae* are

particularly prone to variation in nesting habits within the species.

## HONEYEATERS

The genus *Melithreptus* contains what might be described as the 'black-capped' honeyeaters, although in one species the cap is brown. All but one of the seven birds in this genus also have a crescent of white on the nape. They are distinguishable in some degree by the colour of the skin about the eye.

The White-naped Honeyeater, *Melithreptus lunatus*, is a well-known honeyeater, found from Cairns down through the eastern states to eastern South Australia and Kangaroo Island and the Kent Group in Bass Strait. There is a separate population in south-western Australia, ranging from Moora to Esperance.

The colour of the skin about the eye, known as the orbital band, varies in this species. In Western Australia the more common orange colour is replaced by grey below, and white about, the eye.

This is a nomadic, and even migratory species. North–south movements take place in the spring and autumn, the extent of which have yet to be studied fully. They are a common honeyeater throughout coastal districts and timbered mountain ranges. Chiefly birds of the eucalypt trees, they may be seen, or more often heard, as they busy themselves in the foliage, seeking insects and nectar. The usual call is a rather plaintive, 'tsip-tsip' or 'tserp-tserp', the birds also have a single loud whistle.

The cup-shaped nest is rather deep and constructed of rootlets, bark-fibres and grass, sometimes matted with cobwebs. It is usually suspended in the drooping twigs of a leafy branch at heights up to thirty feet. Animal hair may be used in the nest, and the honeyeater can sometimes be seen perching on the backs of horses and cattle, plucking out hairs.

Two or three pale buff eggs are laid, finely spotted with reddish-brown and pale grey. The breeding season is from July to November in the east and later in the west, where eggs are laid from November to January.

The White-throated Honeyeater, *M. albogularis*, is found from the Kimberleys, across northern Australia and down to about the Nambucca River district in N.S.W. These honeyeaters seem to prefer the well-watered areas of their range.

VARIED HONEYEATER 7½ in.

PURPLE-GAPED HONEYEATER 7 in.

BRIDLED HONEYEATER 7 in.

GREY-HEADED HONEYEATER 7½ in.

SINGING HONEYEATER 7½ in.

MANGROVE HONEYEATER 7½ in.

Like the foregoing species, this bird has a loud clear whistle, but its usual call is a series of rapid hissing notes which are more varied than the White-naped Honeyeaters'.

The nest is similar to that of the White-naped Honeyeater. The two eggs are salmon-pink or reddish-buff, and are spotted reddish and grey, often in a zone at the larger end. The breeding season is from July to January.

The Black-chinned Honeyeater, *M. gularis*, is found down through eastern Australia outside the tropics. Apart from its north-eastern Queensland haunts this bird seems to prefer the hotter inland areas.

This species frequents open forests, seeking nectar and insects amongst the foliage. They are usually seen in small parties. A loud whistling call may be heard at most seasons, and in the spring this honeyeater has a rich and varied song of great volume.

A neat cup of fine bark and other fibres is bound together with cobwebs for a nest. This is suspended from the drooping twigs of a heavy branch. Wool or fur is often used as a lining.

Two eggs are laid which are varying shades of flesh-colour with spots and blotches of purplish-red mainly at the broader end. The breeding season is from July to December.

The Golden-backed Honeyeater, *M. laetior*, is a tropical species, found in mid-western, central, and northern Australia, reaching Lake Eyre in the south and the Gulf of Carpentaria in the north-east.

These birds hunt vigorously through the foliage, like others of the genus, in search of insects and nectar. The call-note is a single loud whistle but the bird also has a very beautiful song, which has been compared to that of the Song Thrush. Both sexes indulge in singing.

A typical *Melithreptus* nest is built and suspended from the thin twigs of a leafy bough. The one, or sometimes two, eggs are a pale fleshy-buff, with spots of reddish-brown, mainly at the larger end. An interesting case of communal nesting was recorded in Western Australia. Five birds built a nest and reared the two young birds, and the seven of them remained together, in the vicinity, for months afterwards. Breeding takes place in the spring.

The Strong-billed Honeyeater, *M. validirostris*, is confined to Tasmania, King Island and the Flinders Group in Bass Strait.

They are quite a common species, frequenting both forest and scrub country, in pairs or small flocks. These honeyeaters are very active in their search for insects, and they have the habit of levering up and splitting open pieces of eucalyptus bark in search of food. It is interesting that the Strong-billed Honeyeater is so seldom seen amongst the blossoms, and apparently the nectar, so important to most

FUSCOUS HONEYEATER 6in.

WHITE-PLUMED HONEYEATER 6½in.

YELLOW-PLUMED HONEYEATER 6½in.

YELLOW-TUFTED HONEYEATER 7½ in.

YELLOW-FRONTED HONEYEATER 4½in.

other honeyeaters, is only a minor part of their diet.

The call of these birds is a cheeping sound, but attention may often be drawn to them by their noisy scrabbling and tearing amongst the loose bark so typical of the eucalypts.

A cup-nest of bark-fibres, grass, wool, and similar materials, is suspended from a drooping leafy branch. The two, or sometimes three, eggs are flesh-pink with brown or red spots and the breeding season is from July to December.

The Brown-headed Honeyeater, *M. brevirostris*, is found in eastern Australia from southern Queensland to southern South Australia, King Island and Kangaroo Island. There is a separate population in the south-west of Western Australia, where it appears to avoid the jarrah forests, making its headquarters in the mallee and salmon-gum country.

Throughout its range this bird is inclined to be a species of the drier scrubs or open-forest country. They move about the country-side in flocks of up to a dozen or so, searching the foliage and blossoms for insects and honey.

The call is a simple 'chick-chick', although some observers report 'a number of brisk and cheery calls'.

The nest is not often found, but is a firmly-woven cup of bark-fibre, grass, cobwebs and hair. The usual nesting-site is in the top twigs of a sapling about twenty feet high, but low nests have also been found.

Two or three eggs are laid which are fleshy-buff, spotted with reddish-chestnut and grey. The breeding season is from August to December so far as is known.

The Black-headed Honeyeater, *M. affinis*, is another species of limited range, being confined to Tasmania and the islands of Bass Strait.

They are quite common birds, and may be seen in flocks, even during the breeding season. Black-headed Honeyeaters are very active and pugnacious, and attract a good deal of attention as they feed in the blossoms and foliage of the open forest. These birds also habitually visit orchards and gardens in search of fruit to supplement their 'wild' diet of insects and honey. The call is a sharp clear whistle, fairly often repeated.

This honeyeater builds a nest of wool, moss, grass and other fine materials. It is generally placed in the topmost twigs of a sapling and sometimes is blown down in storms. The species is noted as a favourite host for the Pallid Cuckoo.

Three pale pink eggs are laid and these are spotted with reddish markings. The breeding season is from October to December.

The Striped Honeyeater, *Plectorhyncha lanceolata*, is chiefly a bird of the inland areas of eastern Australia where it ranges from northern Queensland to the Yorke Peninsula in South Australia.

On the hotter, inland parts of the eastern states, this honeyeater may be met with in pairs or sometimes singly. Parties have sometimes been observed, especially in autumn, when the birds are moving to new grounds.

They are restless, noisy birds and their loud, cheerful whistling call attracts attention to them. This has been rendered, 'chirp-chirp-cherry-cherry-chirp'. Although insects and honey are probably its main diet, the bird is unpopular with orchardists because of its depredations amongst their crops. The yellow flowers of the tobacco-bush hold a great attraction for these birds.

The Striped Honeyeater builds a deep, cup-shaped nest, of rootlets and grass, thickly matted together with wool, feathers, plant-down or other soft material. The nest is usually suspended from the drooping twigs of a tree such as a she-oak. These honeyeaters are particularly bold in the defence of their nest, and they may sometimes be found nesting in association with the Grey Butcher-bird.

Three or four, pale pinkish-white eggs are laid which are spotted and blotched with chestnut and grey. The breeding season is from August to December.

The Scarlet Honeyeater, *Myzomela sanguinolenta*, is found from the Cooktown area in Queensland down to eastern Victoria. These very handsome little birds are nomadic, and rather erratic in their changes of territory. Movements are governed by the flowering of the various trees, from which they obtain honey.

On the southern parts of its range, this honeyeater tends to be a summer visitor only, although in mild seasons

a few birds will remain south all the winter, feeding on insects and whatever honey is available.

This bird is one of the few that may be heard during the hotter parts of the day in summer. The male has a pleasant 'tinkling' song and the female also sings, only less expertly.

A small, rather frail nest is built, of bark-fibres and strips of bark, matted together with cobweb. It may also be lined with grass. At any height from a foot or two to thirty feet up, the nest is suspended from a few twigs at the end of a branch.

Two, or more rarely three, eggs are laid, and these are white, faintly tinged with pink, and spotted with dull yellow, chestnut and purplish-grey, mainly at the larger end. The breeding season is from October to January.

Red-headed Honeyeaters, *M. erythrocephala*, are very similar in colour to the foregoing bird, but their ranges do not overlap except perhaps in north-eastern Queensland. The Red-headed Honeyeater is mainly a species of the mangroves and is found from Derby in Western Australia to Townsville in Queensland.

Although most of this bird's time is spent in the mangrove swamps, it does make short excursions to feed on the honey of flowering eucalypts in the contiguous scrub or open-forest country.

Its voice is not as strong as that of the Scarlet Honeyeater, and it also utters a sharp 'chirrup' call as it flits actively about the foliage and blossoms.

A nest is made of bark and fibres, matted together with cobweb and, as a rule, it is placed in the top of a tall mangrove. The two white eggs laid are spotted with pale red and grey blotches and freckles, mainly at the broad end. The breeding season is recorded as October to January.

The Banded Honeyeater, *M. pectoralis* is distributed from the Kimberleys across the Northern Territory to northern Queensland.

These birds appear to be nomadic, their movements being controlled by the flowering of the trees and the honey-flow. They are an active and quarrelsome species, even for a honeyeater, and when the trees of a locality are in full bloom, Banded Honeyeaters gather in considerable numbers.

The male bird's call is a double-whistle, and he also has a 'cheerful tinkling song'. Some of the birds hitherto considered to be females may in fact turn out to be immature specimens. Some photographs taken in the Kimberleys of nesting birds, show both birds at the nest in 'male' plumage.

A delicate, cup-nest of strips of ti-tree bark is bound together with cobwebs. This structure is extremely frail and the eggs can often be seen from below. Melaleuca trees seem to be preferred as a nesting-site, and indeed, Brigadier Officer states in his book on honeyeaters, that he saw none of these birds in northern Queensland, where a certain species of flowering melaleuca did not occur.

The two buff or cream eggs have a zone of darker buff about the longer end. The breeding season is from October to January and sometimes later.

Black Honeyeaters, *M. nigra*, are birds of the interior outside the tropics, being only rarely recorded near the coast. These honeyeaters may be seen in small flocks, although they are not common, and are extremely erratic in their regional movements, appearing for only one season in years in a given locality. On very hot dry summers they move further south and will be seen in Victoria.

The bird shows a definite predilection for the Emu Bush (*eremophila*), the flowers of which, it visits very consist-

ently in some localities. Its chief call is a rather monotonous, insect-like 'peeee' and also a sparrow-like 'chip-chip'.

A fragile cup, much shallower than the nests of the rest of the genus, is built into the twigs of a low bush, up to six feet from the ground. It is constructed of twigs and dry grass. The usual number of eggs is two, and these are buff with a zone of small brown spots at the longer end. The breeding season is usually from September to December.

The genus *Acanthorhynchus* contains two richly-coloured birds with very long, graceful down-curved bills. The eastern and western species are closely related.

The Eastern Spinebill, *Acanthorhynchus tenuirostris*, is found throughout eastern Australia in areas that are not too dry. It ranges from Cairns to south-eastern South Australia, then north to the Flinders Ranges. It is also common on Kangaroo Island, Tasmania and islands in Bass Strait.

This species favours both heathlands and bush country and has also taken freely to visiting suburban gardens to feed amongst the cultivated shrubs.

Even amongst the active honeyeaters, these birds must be called restless; they flick down on to a bush, quickly probe deep into a bloom or two, and are away again in a flash of their chestnut and curving bill. They also hover in front of the flowers quite frequently like giant hummingbirds, or flit from flower to flower.

The most commonly-heard call of this honeyeater is a shrill whistle, although it has other shrill musical notes. A strange sharp crack can often be heard from the bird's wings, as it darts away from the observer.

A cup-shaped nest is built, of bark, grass and moss and lined with hair and feathers. As a rule, it will not be very high, but nests have been found up to fifty feet aloft. It is suspended from a thin horizontal branch or the drooping, leafy twigs on the outer part of a bush or tree.

Two or three eggs are laid which vary in ground colour from white to a buff-pink. These are spotted all over with chestnut and grey. The breeding season extends from August to December and later.

The Western Spinebill, *A. superciliosus*, is confined to the south-western corner of Australia, and is found roughly inside a line drawn from Moora on the west coast to Israelite Bay on the south coast.

These are a very common honeyeater within their range, and are absent from only a few localities. They show a great predilection for banksia country and are also partial to Kangaroo-paw flowers.

Western Spinebills are similar to the eastern birds in their vigorous activities amongst the foliage and flowers, except that the western species has not taken to gardens in the same way.

The nest, compactly matted together, is made of bark, plant stems and cobwebs, and is lined with plant-down. It is usually suspended in a few outer twigs, up to ten or twelve feet from the ground.

The female does the major part of the building and incubates her eggs alone. The male joins her in raising the offspring however, and belligerently defends the nesting-area. He has a territorial display-flight, in which he goes up vertically for thirty feet or so, to sing at the peak of the climb and for the first foot or so of the descent.

The early nesting pairs usually have only one egg and the later breeders, two. The egg or eggs are whitish, pale buff or sometimes pinkish. They are lightly speckled and blotched with chestnut and purplish-brown, sometimes forming a zone at the broader end. Eggs have been found in nests from August to January.

The genus *Gliciphila* contains five rather dissimilar-looking species. Two of these have the distinction of being the only Australian honeyeaters that build domed nests. One of the five, the White-fronted Honeyeater, is separated into a different genus by some ornithologists, and called *Phylidonyris albifrons*.

The Tawny-crowned Honeyeater, *Gliciphila melanops*, is distributed, in suitable country, through most of Australia outside the tropics. It also inhabits Kangaroo Island, Tasmania and the islands of Bass Strait.

These slim, rather long-billed honeyeaters are usually seen in pairs or singly, and they inhabit heathlands and light scrub country such as mallee and banksia areas.

They are shy birds and extremely restless, a combin-

STRONG-BILLED HONEYEATER 6½in.

BROWN-HEADED HONEYEATER 5½in.

ation which makes field observation difficult. The sweet, fluting whistle of the song has a wistful and somewhat ventriloquial quality, and is frequently heard without one catching more than a glimpse of the singer.

The species feeds in a typical honeyeater manner on honey and insects. They are darting fliers and also indulge in a 'towering' flight, where they soar upwards for fifty or a hundred feet, singing as they go. The bird then plunges down vertically into the heath, still singing.

A deep cup-shaped nest is built, of bark and grass, and lined with wool or other soft materials. The whole is well matted together with cobwebs and hidden close to the ground in a low bush or tussock.

The two, or sometimes three, eggs are white or pink, with a few spots of brown. The breeding season is from June to February and sometimes later.

The White-fronted Honeyeater, *G. albifrons*, is distributed generally throughout Australia except for the tropics. It is very rarely seen near the coast in the south and east although there is one record for Kangaroo Island, and it has been seen in the You Yang ranges near Geelong in Victoria.

These birds, with their pale faces, narrow heads, and rather scale-patterned plumage, have quite a reptilian appearance as they twist themselves about to reach into the blossoms. They frequent hot dry country, as a rule, being typical birds of the mallee and hakea scrub areas.

These honeyeaters have a variety of calls and notes, such as a loud metallic 'chip-chip', a drawn out 'cree-e-e-e-k' and some more musical phrases, reminiscent to some observers, of the reed-warbler.

A cup-nest is built, of bark-fibres and grass, bound together with cobwebs, and usually lined with wool or plant-down. The common site is in the leafy top of a small bush, but the nest is sometimes tucked behind a curling flake of bark on a tree-trunk.

Two, and sometimes three, eggs are laid which are pinkish-white, spotted with red-brown, mainly at the broader end. The breeding season is from August to January.

The Brown-backed Honeyeater, *G. modesta*, is confined to the Cape York Peninsula and down to about the Burdekin River district. This species also inhabits New Guinea and the Aru Islands.

This noticeably large-billed honeyeater is a bird of the mangroves, ti-tree swamps and adjoining scrub, especially during its breeding season. After nesting, they appear to desert these haunts, but little information is available about their movements at this time.

A monotonous and indistinctive call may be heard, and in flight this honeyeater calls 'mick-mick'. The diet consists of insects and honey.

A dome-shaped nest is constructed with a hooded side-entrance and generally made of fine strips of paper-bark. This is one of the only two species of Australia honeyeater to build a dome-shaped nest. The nest is suspended in a few twigs of a paper-bark only eight or ten feet from the ground. It usually hangs over the water and is sometimes built near a wasp's nest.

Two or three white eggs are laid which are sprinkled with fine brown and purplish-black dots, mainly at the larger end. The breeding times are related to the rainy season, nests may be found at most times except the middle months of the year, and breeding is probably at its peak at the end of the 'wet'.

The White-breasted Honeyeater, *G. fasciata*, (called the Bar-breasted Honeyeater in some publications) is a tropical honeyeater found from the Fitzroy River in the west to the Mackay district in Queensland.

These rather silent birds frequent the paper-bark swamps and are usually seen in pairs or other small numbers. It has a repetitious piping call but no song is recorded. Although quiet, they are active birds, hunting amongst the blossoms for insects and honey.

With the foregoing species, this honeyeater has the distinction of building a domed nest. It is a fairly bulky construction of paper-bark strips, lined with finer strips and bound together with cobwebbing. The usual site is at the end of a thin branch hanging out over the water.

Two or three eggs is the normal clutch, and these are white with reddish-brown markings. The birds breed

BLACK-HEADED HONEYEATER 5in.

STRIPED HONEYEATER 9in.

from October onwards as a rule, although nests have been found in July.

The Brown Honeyeater, *G. indistincta*, is found in suitable localities throughout most of Australia except Victoria and South Australia. It is also a native of New Guinea and the Aru Islands. This honeyeater has been placed by some ornithologists in a separate genus and called *Lichmera indistincta*.

Rather catholic in its choice of habitats, this plainly-coloured bird frequents mangroves, and can be seen in the flowering scrub and trees along creeks and rivers and in the more sparsely vegetated areas of the centre and the north-west, but always near water.

These honeyeaters are beautiful songsters, considered by some observers to be without peer amongst Australian birds. They sing readily, but are particularly vocal in the mornings and evenings.

The diet consists mainly of honey, supplemented with a few insects: the flowers of the callistemons and coral-trees are favoured by the bird.

A small, neat cup-shaped nest is constructed, of soft bark-fibres and grass and bound about with cobwebs. It is lined with hair, fibres, grass or plant-down, and placed in the forked branch of a bush or small tree. The nest is usually low down, but may be at heights to twenty feet, and is often overhanging water.

Two eggs are usually laid, which are white with few, if any, specks of pale chestnut on the larger end. The breeding season is from June to January.

The Painted Honeyeater, *Grantiella picta*, is distributed from about the Darwin area in the Northern Territory across to the Leichhardt River district in Queensland, and down to northern Victoria.

This honeyeater is most unusual in that it lives largely on the berries of mistletoes. It tends to be a migrant to the southern parts of its range, arriving in September and departing again during February and March. The bird's movements are erratic however, as it follows the fruiting of the mistletoe, and it turns up at unexpected times.

A loud and clear, 'geor-gie, geor-gie', is the chief call of this honeyeater and it also utters a harsh 'chee-haw'.

The nest is a very delicate, although strong, construction of thin strips of bark and bark-fibres, bound together with cobweb. The eggs can often be seen from below, through the rather lacy construction of the nest. It is built into the outer, drooping twigs of a branch at heights from a few feet up to twenty feet or so from the ground.

Two eggs are normally laid, and these are a delicate salmon-pink, spotted with darker red and lilac, usually heavier at the broad end of the egg. The breeding season is from October to February.

The Grey Honeyeater, *Lacustroica whitei*, is a western and central Australian species. It is distributed from the Ashburton River down to about Geraldton on the west coast, inland to the Macdonnell Ranges in the Centre, and up to the Tanami district in the Northern Territory.

Some ornithologists put this species in a different genus, calling it *Conopophila whitei*.

This short-billed, rather 'un-honeyeater-like' species, has more the habits of a silvereye than of a member of the *Meliphagidae*. They even appear to have no predilection for eucalypts, but prefer the mulga and other acacia scrubs.

They are usually seen in pairs, and have a call of five or six sibilant, high-pitched musical notes, uttered in quick succession. The diet of this species appears to be mainly insects which it gathers amongst the foliage.

A frail nest is built, loosely woven about with cobwebs and long horse-hairs. The structure is delicate enough for the eggs to be visible from below. Both birds assist in

the nest-building, and it is usually attached by cobwebbing to the outer end of a thin branch.

Two eggs appears to be the normal clutch, and these are marked with a few rich brown spots over pale grey. The breeding season is from about August onwards, as a rule, but these birds have been found breeding in May in the Musgrave Ranges in South Australia.

The Rufous-banded Honeyeater, *Conopophila albogularis*, is a tropical bird, found in the northern part of the Northern Territory and in northern Queensland to about the Townsville area.

This rather dowdy honeyeater is an active bird flitting about the branches in search of insects and rapidly inspecting heads of blossom for honey. It flies out of the foliage now and then for a short, singing flight. The song is quite melodious and attractive.

Favourite haunts of this bird are the mangroves and ti-tree swamps which are common within its range. It is one of the most numerous honeyeaters in the mangroves, but appears to be nomadic and irregular in its movements, sometimes disappearing from areas where it has been common.

A small, cup or purse-shaped nest is built, and suspended by its rim from a thin horizontal fork. The nest is made of bark fibres, plant stems, grass and spider-webbing, and often hangs out over the water. The normal clutch is three, although four eggs have been recorded. These are white, finely freckled all over with bright chestnut, and more

RED-HEADED HONEYEATER 4½in.

thickly spotted at the broad end. The breeding season is from October to January.

The other bird in this genus, the Rufous-throated Honeyeater, *C. rufogularis*, is also a soberly-coloured little bird except for the rich chestnut throat. The throat patch is very hard to see and is not present in some individuals. In some publications this species is called the Red-throated Honeyeater.

Their range is tropical northern Australia, from the Kimberleys to northern Queensland; they have been recorded as far south as Bundaberg.

In pairs or small flocks, these birds may be seen busily hunting through the flowering shrubs and trees and stands of tall grass, in search of insects and nectar. They make frequent short flights in pursuit of insects and capture them on the wing.

These honeyeaters are common birds along the waterways of the Northern Territory and the Kimberleys, where they are frequently seen and heard. They are seldom far from water and they drink and bathe often, through the hot part of the day. The call is little more than a chattering, and there is apparently no song.

A deep cup-nest is built, of soft bark and grass, strengthened with stiff grass stems, and well matted together with plant-fibres. A lining of fire-grass is added and the nest is slung from the pendent twigs of a branch at any height up to about twenty feet from the ground.

Two or three eggs are laid which vary a good deal in size, shape and colour. A common clutch is whitish with pink and red spots speckled evenly over the eggs. The breeding season is from October to February or later but breeding birds have been found in July.

The Pied Honeyeater, *Certhionyx variegatus*, has its greatest numbers in Western Australia where it ranges south to about Geraldton on the coast, inland to Naretha, and north to the Fortescue River. Its range extends through Central Australia to the western parts of Queensland, N.S.W., northern South Australia and north-western Victoria.

This honeyeater is a bird of the dry country and low scrub. In pairs and small parties, they move about the country, seeking out flowering bushes and hunting for insects through the foliage. In some parts of their range they are considered to be winter visitors, arriving after the first winter rains, and on migration they have been seen in flocks.

The are swift-flying birds, and the male has a striking 'territory-defence' flight. Rocketing up into the air the bird then descends slowly with its tail spread, in a series of aerial evolutions. During the display it often calls, giving out a piercing 'te-titee-tee-tee'.

This territory display appears to be indulged in before the mating of the birds and nesting. Once this is under way, the birds become much more silent and secretive (Serventy and Whittell). Some observers, however, have seen this display flight actually taking place over the nest.

A strong cup-nest is built, made of grass and well-bound with cobweb. It is usually hung from the fork of a low branch. A red-flowering hakea (*multilineata*) is frequently chosen in Western Australia but other low, thick shrubs are also utilized, and the nest is placed at heights up to fifteen feet from the ground.

Both birds share in building the nest and the duties of incubation. The female will resort to the 'broken-wing' decoy, if disturbed at a nest containing young birds.

The eggs are not typical honeyeater eggs, being white, or occasionally buff-white, marked liberally with grey and dark brown spots and blotches. They look rather like the eggs of the Dusky Wood-swallow, but are smaller. Two, three, or more rarely four, eggs are laid; such a large clutch also being unusual amongst the *Meliphagidae*.

The breeding season varies: the chief times are noted as October to February, but, for example, in the Murchison River district in mid-Western Australia, the peak of the breeding is in September, while in Central Australia it is in April and May.

The Regent Honeyeater, *Zanthomiza phrygia*, is found from southern Queensland down to Victoria, south-eastern South Australia and Kangaroo Island. This striking and handsome honeyeater becomes less common at the northern and southern limits of its range.

Open-forest country is the chief habitat of this bird where it may be seen individually or in any number up to quite large parties. They are nomadic birds, following the honey-flow, and also feeding on insects. In more settled areas, their liking for fruit leads them into orchards, where they will sometimes cause a great deal of damage.

Regent Honeyeaters are a pugnacious species, squabbling amongst themselves as well as chasing off other birds.

The chief call of this honeyeater is a metallic, or bell-like 'clink-clink,' and the bird bows its head each time it utters the call; in flight it has a loud chattering call. In some places this honeyeater has taken well to the encroachment of civilization. It can still be seen in some Melbourne suburbs, and in Bendigo, for example, is a frequenter of the public gardens.

A cup-shaped nest is built, of plant-fibres and bark-strips, and lined with soft material such as thistledown. It

is usually built into a forked branch of a tree, at various heights, from about three feet to twenty feet from the ground.

Two or three eggs are laid which are a rich pinkish or reddish-buff, with a darker tone at the larger end. The eggs are spotted darker red and brown. The breeding season is from August to January.

The Green-backed Honeyeater, *Glycichaera claudi*, has only been seen so far, in the area of the Claudie River on Cape York. This mysterious honeyeater has been observed but little, it is described as looking somewhat like a silvereye only with a longer, more heavier bill.

This species frequents the large tropical scrubs and tall forests. It feeds in the high foliage canopy and is thus difficult to observe. Its call is said to be distinctive, but other observers, have heard it utter 'no more than a busy twittering' (Officer).

No nest has been found, and the bird itself was only collected in 1913, in the Claudie River district.

The genus *Meliphaga*, the type-genus of the family, contains more species than any of the other genera. There are twenty-two of them and they tend to be medium-sized, greenish-grey or greenish-brown birds. They are also typified by contrasting, or other marks of colour, about the head.

The Lewin Honeyeater, *Meliphaga lewinii*, is an eastern Australian species, found from central Queensland (the Atherton Tableland), down to eastern Victoria about the Gippsland Lakes and possibly into the Dandenong Ranges.

On the whole, this is a honeyeater of the coastal scrub-country and nearby wooded ranges. It is seldom seen on the forested flat country further inland. They are rather inquisitive and fearless birds and can be called up with squeaking 'birdy' sounds.

The diet of these birds consists rather more of insects and fruit than of honey, and in some districts their taste for cultivated fruits has made them rather a nuisance.

This honeyeater calls frequently with a loud, staccato call of 'dot-dot-dot-dot' with a machine-gun-like rhythm.

A cup-shaped nest is built, composed of strips of bark, rootlets, moss, a few leaves, and similar materials. It is bound together with cobwebbing and well lined with dried grass or plant-down.

The nesting-site is any thick tree or bush and the nest is suspended by the rim from a few thin twigs. The height may be anywhere from five to twenty feet or so above the ground.

The Lesser Lewin Honeyeater, *M. notata*, is found only on Thursday Island and in north-eastern Queensland, where it ranges from Cape York down to the vicinity of Cardwell.

This bird very closely resembles the Lewin Honeyeater in form and colour. Their voices are the best means of identifying them in the field where their ranges overlap. The Lewin's 'dot-dot-dot' is quite dissimilar from the Lesser Lewin's wheezy and rather complaining 'ee-yeu-ee-yeu'. The Lesser Lewin Honeyeater also tends to be a coastal species, whilst the other bird is more frequently found in the ranges, just back from the coast.

The Lesser Lewin Honeyeater is a bird of the thick scrub and forest and will also be found in mangroves. It shows a strong preference for vegetation near creeks and other water, where it finds a plentiful supply of insects. The bird's diet is supplemented with fruit, and honey forms only a small part of its sustenance. It has acquired a taste for cultivated fruit and fearlessly visits orchards and gardens in search of it.

A nest is made of melaleuca bark (the paper-bark ti-tree) and other plant-fibres, bound together with cobwebs

EASTERN SPINEBILL 6¼in.

or wild cotton. Plant-down is used for a lining and the nest is suspended from forked twigs in dense foliage. The usual nesting-sites are low down, five or six feet being common, but nests have been found as high as twelve feet.

The normal clutch is two eggs, which are white, with small dots and blotches of reddish or purple-brown, usually confined to the broader end. The breeding season is from October to March.

White-lined Honeyeaters, *M. albilineata*, appear to be confined to the Northern Territory in the King River and South Alligator River areas. Little has been observed or recorded of this bird, which in some publications is called the White-striped Honeyeater.

The rocky gorges of sandstone hills, and the hill-streams through the sandstone ridges are this bird's favoured habitats, but it does not seem to be a common species even in its habitat. It feeds actively amongst the flowering eucalypts and may be heard to call now and then, but not frequently. The bird utters a clear whistling 'tu-u-u-heer, tu-u-u-in', which rings loudly in the quiet gorges.

This rather undistinguished looking honeyeater was first collected in October 1915 for the famous H. L. White collection, and was the last honeyeater to be added to the Australian list. No nest has yet been discovered.

The Singing Honeyeater, *M. virescens*, or Black-faced Honeyeater, as it is called in some publications, is found throughout most of Australia. It is absent from Arnhem Land, Cape York and the east coast of Australia. It is plentiful on the coast west of Port Phillip Bay.

In pairs or in small numbers, this bird may be met with in almost any kind of habitat except thick forests, and is one of the most wide-spread of the *Meliphagidae*. The name 'black-faced' is rather more appropriate as the bird's voice does not compare in quality with that of many other honeyeaters that really *do* sing, although in Western Australia where the birds were first named, they do have rather better voices.

They are a bold and pugnacious species, and are especially quarrelsome towards other species of honeyeaters. These birds will seldom allow other honeyeaters to feed in the same tree with them. The diet of the species is fairly wide: it feeds on insects, native fruits, honey and also cultivated fruits, having developed a taste for grapes in particular.

Some observers have heard these honeyeaters singing tunefully in Western Australia, but its more usual voice can only be termed 'calls'. One is a loud 'terrick-terrick', another is a rapid 'rer-rer-rer', and a hoarse croaking cry is sometimes given.

An untidy nest is built, of grass, rootlets and other plant-matter, woven together with spider-webbing, and lined with any soft material such as wool or plant-down. The nest is seldom higher than six or eight feet, and is placed in a thick bush of any kind that is available. Two, or sometimes three, eggs are laid which are buff-white to salmon in ground colour. The broad end of the egg is usually darker and has a few spots of chestnut or brown.

The breeding season varies in the inland, being related to the coming of the rains; in the coastal districts the birds breed from about August to December.

The Varied Honeyeater, *M. versicolor*, is a loud-voiced bird, confined to coastal northern Queensland and Thursday Island, and other islands off the coast.

This is an extremely active species, and quite fearless in disposition. They are typically birds of the mangroves, but are found in other types of vegetation associated with water. In Cairns they are a common bird about the streets and gardens, and their loud calls are often heard.

They flit quickly about the foliage and blossoms, hunting for insects and inspecting the blooms for honey. Their striking and varied calls have been likened to phrases such as 'jolly good show', 'turn on the tap', 'strum on the cello', repeated a number of times: if the calls are anything to judge by, the birds are rather sociably inclined.

A rather lightly-built, cup-nest is constructed, of plant-fibres, weeds, dead leaves and rootlets. It is bound together with cobwebs and sometimes a lining of plant-down is added. Usually, the nest is built in a mangrove.

The usual clutch is two eggs which are pinkish-buff, shading darker at the large end, and with a few fine spots of reddish-brown. The breeding season is from July to November.

The Mangrove Honeyeater, *M. fasciogularis*, is found from about Cairns and Dunk Island down to northern N.S.W. This is a honeyeater seldom found far from the mangroves and is thus confined to the coastal area. Various off-shore islands are also inhabited or visited by Mangrove Honeyeaters, and in Brisbane they stray into gardens at times in search of flowering shrubs.

They may be seen singly or in pairs, and also occasionally gather in small flocks. Active feeders amongst the foliage, these honeyeaters are also extremely pugnacious and very noisy. Their ringing calls are reminiscent of the Varied Honeyeater's but lack that bird's wide variety of

WESTERN SPINEBILL 5in.

notes, although some observers consider the bird one of our best singers amongst the honeyeaters.

A nest of vegetable-fibres, rootlets and similar material, is built in the shelter of a thick mangrove tree.

Two, or more rarely three, eggs form the clutch. These are pinkish-buff and darker towards the longer end, which is lightly spotted with brown or purplish-red. The breeding season is from August to December and sometimes later.

Bridled Honeyeaters, *M. frenata*, have recently been named Mountain Honeyeaters in some publications. They are confined to north-eastern Queensland where they frequent the coastal slopes and tablelands. Their northward range is restricted to the Bloofield River district and southwards to the ranges just inland from Mackay.

Rain-forest areas on the hills and steep ridges are the chief habitats of this honeyeater, although they appear to move to lower ground in the winter.

This quietly behaved species is slightly gregarious in small numbers; pairs are seen in the summer and small gatherings at various times of the year. They feed on insects and native fruits as well as nectar, and apparently the blooms of the umbrella-tree are a favourite source of honey. Calls sounding like 'we-are' and 'watchita-watchita' may be heard and the bird also has a harsh scolding note.

An untidy nest is built, of light twigs, tendrils and plant stems, and neatly lined with plant-fibres. The site is usually not above six or eight feet in a tangle of creeper or a thick bush.

Two eggs are laid which are white, finely spotted with reddish-brown and grey, usually with the markings concentrated about the larger end. The breeding season is from October to January.

The Graceful Honeyeater, *M. gracilis*, is distributed in north-eastern Queensland, from Cape York to the Cardwell and Ingham area. Outside Australia this honeyeater also occurs in New Guinea and the Aru Islands. In some publications this bird has been newly named the Grey-breasted Honeyeater.

This soberly-coloured, olive-green little bird is as quiet in its disposition as its looks. The only call likely to be heard from this honeyeater is a quiet 'tick' repeated at intervals, as it works its way through the foliage.

It is a confiding species, and has taken readily to gardens and other cultivated land. The more natural habitat of the bird, however, is light forest and scrub country. It is attracted to heavy lantana growths where it finds both insects and nectar.

Although at first sight this species could be confused with the Lesser Lewin Honeyeater, its smaller size and very quiet call should serve to distinguish it.

The Fuscous Honeyeater, *M. fusca*, is found from Cairns in Queensland down through N.S.W. and Victoria to the east of South Australia where it is rare. Throughout most of its range this honeyeater is a common bird and may be seen in pairs or small flocks.

An open forest species, these birds hunt busily through the foliage of many kinds of trees, in search of insects and honey. They also catch flying insects in quick aerial dashes around the tree-tops.

Their alarm-call is a loud chattering cry rather similar to that of the more familiar White-plumed Honeyeater. The normal call of the bird is a bright and cheery whistling that has been described as 'kitty-lin-toff-toff-toff' and also, somewhat conflictingly, as 'arig-arig-a-taw-taw'.

A very neat and well-made nest is constructed, of grasses or bark-fibres, bound with cobwebs. It is lined with fur, plant-down or any other soft material. Great variations in nesting heights have been recorded, from four feet or so up to the high canopy of the forest.

The clutch is usually three eggs which are a rich yellow or salmon colour, sometimes slightly freckled with brownish-red spots. The breeding season is from July to December.

The Yellow-faced Honeyeater, *M. chrysops*, is an eastern species, found from Cooktown and the Atherton Tableland down to Victoria and south-eastern South Australia.

This species is quite common in most parts of its range, and may be seen in pairs or small parties. There is a definite north-south movement of these honeyeaters in the spring and the autumn, often in considerable flocks.

They are very active birds, and also inquisitive,

adapting readily to gardens and other cultivated and domestic land; considerable damage to orchards is caused by these honeyeaters in some districts.

The song is a sprightly, running series of notes sounding like 'chick-up, chick-up', and other phrases. The diet of the species consists of insects, honey and various soft-fruits.

A very neat nest is built, of grasses, bark and moss, woven together with cobwebs. The lining is of plant-down, wool or fine dry grass. As a rule, the nest is not high up; from four to twelve feet is common, but on occasion, nests will be found in the tree-tops. The bird is bold at the nest, sitting tight on eggs or young, and allowing human intruders to come very close.

Two, or sometimes three, eggs are laid which vary from pinkish to buff in ground colour. They are speckled and blotched with chestnut and purplish-grey, mostly towards the larger end. The breeding season is influenced in some districts by rains, but otherwise is usually from July to November; it has also been recorded in February in Victoria's Western District.

The Macleay Honeyeater, *M. macleayana*, alternatively called the Yellow-streaked Honeyeater in some publications, is found in northern Queensland, from the Cardwell and Ingham area northwards to the vicinity of Cooktown. They do not appear to be a common species, and are usually only seen singly except for breeding pairs.

This strikingly-coloured bird is a honeyeater of the rain-forests and thick brushes, where it hunts for its mixed diet of honey and insects, supplemented with wild berries. It is a shy species, seldom staying long enough to be observed closely, and not calling very often. Various calls might be heard, such as a churring sound, and a rapid 'harry-b-sweet, harry-b-sweet' reminiscent of the Black-throated Warblers' call (Officer).

A cup-nest is built, of dry leaves, plant-fibres and bark, held together with spider-webbing. Fine rootlets, and possibly a few feathers are used for a lining.

Two eggs form the clutch, and these are a fleshy-buff colour, with chestnut and slate-grey markings, mostly towards the larger end. The breeding season is from October to December.

Yellow-throated Honeyeaters, *M. flavicollis*, are found only in Tasmania and the islands of Bass Strait. Actually it is the only member of this genus found in Tasmania.

They are common birds which have adapted easily to man and agriculture. Mountain areas, lowland forest, coastal scrub or cultivated land and orchards, are all places where one might come across this bird. The only preference it seems to show, is for eucalypts, where it seeks both honey and insects.

Yellow-throated Honeyeaters are bold birds, coming freely into gardens, particularly during their winter peregrinations. A number of records exist of this honeyeater alighting on people's heads, in order to pluck at their hair for nesting material.

Various loud and resonant calls will frequently be heard from this species, sounding like such phrases as, 'pick-em-up' and 'chur-uk, chur-uk'. They also have a much more pleasant warbling song, heard mostly at dawn and dusk, as the bird sings from the top of a small tree.

A cup-nest is built, of bark and grass and lined with animal hair, fur or similar materials. It is placed in a low bush, rushes or tussocky grass, very close to the ground.

Two or three pinkish-white eggs are laid which are spotted with red and grey or brown. The breeding season is from July to November and sometimes later.

The White-eared Honeyeater, *M. leucotis*, is a soberly, but handsomely-coloured bird, found from southern Queensland down to Victoria and southern South Australia. This species also inhabits Kangaroo Island and the south-west of the continent from the mulga/eucalypt line southwards, stopping short of the extreme south-west corner.

In pairs or small parties, these honeyeaters frequent heathlands, mallee and open eucalypt-forest country. Heavily timbered and thick brush country are usually avoided. Their diet consists of insects and nectar.

They are bold and inquisitive birds and can be called up close, with imitations of their voice. Their various calls are loud and clear, and carry a long distance. The well known 'chock' or 'chock-chock' is supplemented by other calls such as 'come-up-come-up, do-it-well-do-it-well'.

In the nesting season the birds become even bolder,

BROWN BACKED HONEYEATER 4½in.

YELLOW HONEYEATER 6in.

especially the females, and there are many instances of them having alighted on a human's head, to pluck out hairs for nesting material. Various parts of the clothing are also pounced upon for woolly threads.

The deep and well-made nest is constructed of bark, various plant-fibres and grass, all bound about with spider-webbing. A lining of wool, fur or hair is added. The nest may be at almost any height, although from four to eight feet from the ground would be typical.

Two or three eggs are laid which are flesh-pink or white, spotted thinly with chestnut and pink, mainly towards the longer end. The birds breed from July to December.

The Helmeted Honeyeater, *M. cassidix*, must be one of the most restricted species of bird in the world. They are found in only one small area on the edge of Gippsland in Victoria, along the Woori Yallock and Cardinia Creeks and adjacent areas.

These honeyeaters favour terrain on which the swamp gum (*Eucalyptus ovata*) grows, although they will sometimes also be seen feeding in mixed scrub: their diet consists of nectar and insects. Attention may be drawn to them by a rather sharp trilling note; they will also give vent to a series of 'churc-chure' sounds, and a louder, whistling but unmusical 'tooey-t, tooey-t'.

They are a pugnacious species, and will frequently attack other birds which trespass on their territory. They will be seen in pairs during the breeding season, and small parties in the winter, when they tend to move back from the creek-side scrubs into bigger timber.

The Yellow-tufted Honeyeater, *M. melanops*, is distributed from southern Queensland down to Victoria and the south-east of South Australia, where it may be seen in the Naracoorte district.

In pairs or small flocks, these birds frequent various types of habitat, from coastal scrubs to bigger timber in the sub-interior, with a preference perhaps for the latter. On the whole, these honeyeaters will be found close to water, which they visit frequently throughout the day to both drink and bathe.

It is an inquisitive, lively and sociable species, with a number of loud but tuneless calls very similar to those of the Helmeted Honeyeater. In addition there is a harsh screeching cry, uttered as the bird flutters over the ground, feigning injury to lure one away from a nest of fledglings. This species has the same curious habit as the Helmeted Honeyeater, of gathering in numbers on a small branch, calling together and vibrating their drooping wings.

The diet is honey, insects and native fruits. These honeyeaters have also developed a taste for domestic fruit, and in some areas are making a nuisance of themselves in orchards and gardens.

A cup-nest is constructed of bark-strips and coarse grasses, bound together with spider-webbing and lined with soft materials such as plant-down, hair or feathers. It is usually suspended from the twigs of a low bush, but may be in a higher, forked tree-branch or tucked behind a slab of curling bark.

The two, or sometimes three, eggs are pinkish-buff with darker red and grey markings, mainly about the broader end. The breeding season is from July to December and sometimes later.

Purple-gaped Honeyeaters, *M. cratitia*, have a wide distribution through N.S.W., Victoria, South Australia and Kangaroo Island. There is another population in Western Australia, where the birds range north to the Wongan Hills, east to Lake Grace and south-west to the Stirling range.

This species avoids the heavier, damp forests and is found in mallee, lightly timbered sand-dune country, and open river-flats with a few scattered eucalypts. In some parts of their range they are very common; in Hopetown (Western Australia), for example, these honeyeaters are frequently met with in the tree-lined streets, where they feed on insects and nectar.

Purple-gaped Honeyeaters are active and rather bold birds, particularly during the nesting season. They have a few harsh chattering notes but lack any significant song.

The nest is suspended from a few twigs in a bush or the drooping branch of a tree, and is usually only a few feet from the ground. It is made of bark, grass and plant stems, bound together with cobwebs. Plant-down and fine grasses are used for lining.

Two pale pink eggs form the clutch, and these are spotted red and brown at the longer end. The breeding season is from August to December.

The Grey-headed Honeyeater, *M. keartlandi*, is found from north-western and Central Australia, eastwards to about Cloncurry in Queensland and southwards to the top parts of South Australia. Westwards it extends to the Hamersley Ranges.

In pairs or small gatherings, these honeyeaters may be seen in the rocky gullies of the ranges, where they frequent the stunted scrubs growing about springs and small creeks. They feed on insects and nectar, and utter a 'chip-chip' note as they move through the scrub. They also have a babbling song which, although not very musical, is quite a cheerful sound. There is also another call—a loud, 'chu-toyt'.

The nest usually is built down low; with little or no attempt at concealment, it is suspended in the leafy twigs of a drooping branch. A bush or tree growing in a dry creek-bed or on the bank, is frequently chosen to build in. Fine strips of bark, grass stems and plant-down are matted together with cobwebs, and although the nest is not hidden away, it usually blends remarkably well with the surrounding foliage.

Two creamy-white or fleshy-buff eggs form the clutch, and these are spotted or clouded with dull reddish-brown. Nesting will take place at any time after good rains, but from July to November are perhaps the most common breeding months.

The Yellow-plumed Honeyeater, *M. ornata*, which is being named the Mallee Honeyeater in some publications, is restricted to the mallee districts at the junction of South Australia, Victoria and N.S.W., except for a population in south-western Australia, where these birds are more catholic in their choice of habitat.

They are vigorous, quarrelsome honeyeaters, squabbling amongst themselves and making concerted attacks on any other species that is unfortunate enough to join them in their feeding. They have loud warning calls, which are taken up by the whole flock, when a predator is sighted.

All the notes and calls of these honeyeaters are loud and inclined to harshness. They are one of the first birds to be heard announcing the new day—often starting up well before dawn. Yellow-plumed Honeyeaters also have a song-flight, in which they dash vertically into the air for twenty or thirty feet, calling loudly at the peak of the rapid climb and as they descend more slowly.

The diet of these birds is largely honey, obtained from the blossoms of various eucalypts, but this is supplemented with spiders and insects.

especially the females, and there are many instances of them having alighted on a human's head, to pluck out hairs for nesting material. Various parts of the clothing are also pounced upon for woolly threads.

The deep and well-made nest is constructed of bark, various plant-fibres and grass, all bound about with spider-webbing. A lining of wool, fur or hair is added. The nest may be at almost any height, although from four to eight feet from the ground would be typical.

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The diet is honey, insects and native fruits. These honeyeaters have also developed a taste for domestic fruit, and in some areas are making a nuisance of themselves in orchards and gardens.

A cup-nest is constructed of bark-strips and coarse grasses, bound together with spider-webbing and lined with soft materials such as plant-down, hair or feathers. It is usually suspended from the twigs of a low bush, but may be in a higher, forked tree-branch or tucked behind a slab of curling bark.

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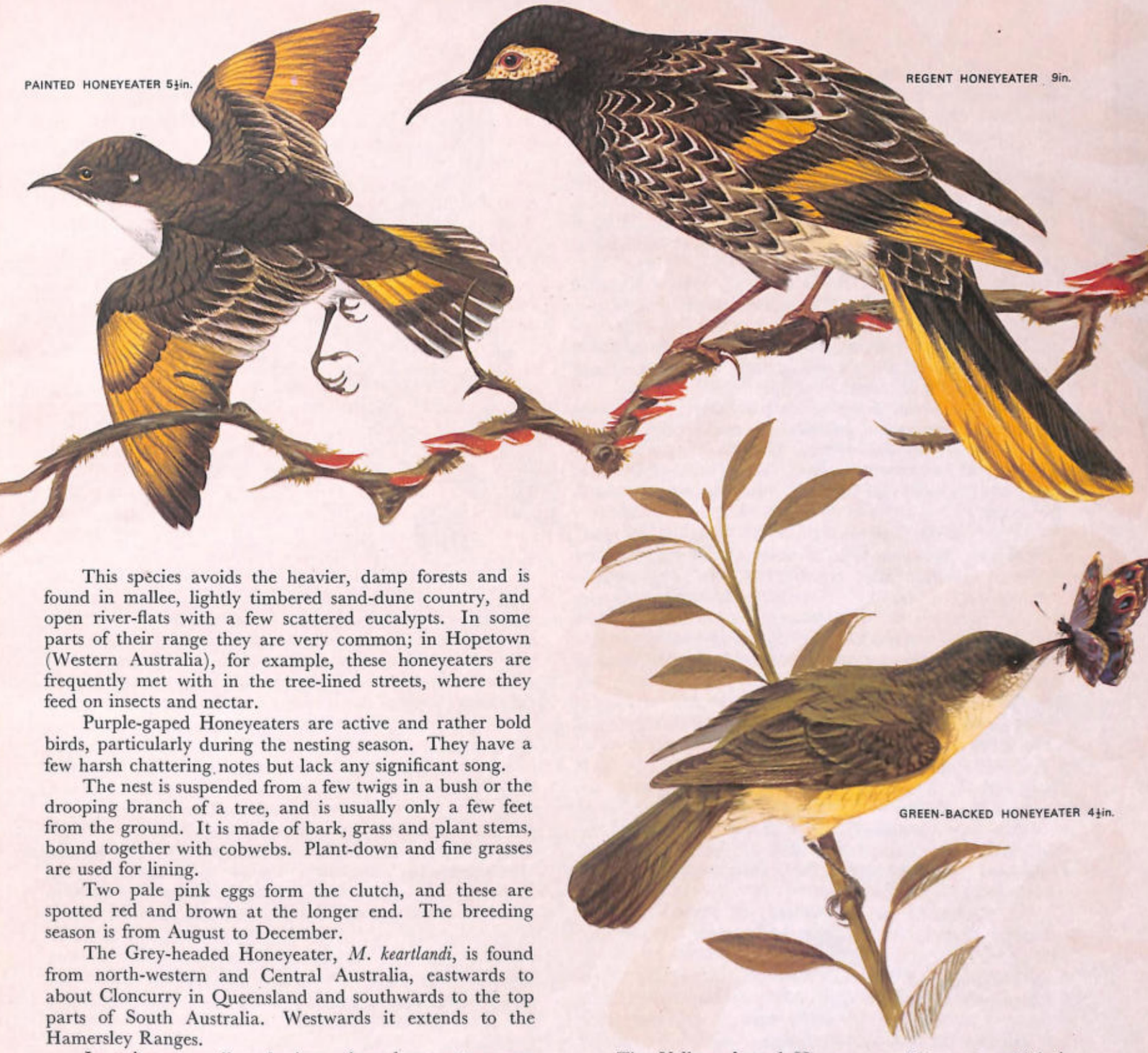


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Two pale pink eggs form the clutch, and these are spotted red and brown at the longer end. The breeding season is from August to December.

The Grey-headed Honeyeater, *M. keartlandi*, is found from north-western and Central Australia, eastwards to about Cloncurry in Queensland and southwards to the top parts of South Australia. Westwards it extends to the Hamersley Ranges.

In pairs or small gatherings, these honeyeaters may be seen in the rocky gullies of the ranges, where they frequent the stunted scrubs growing about springs and small creeks. They feed on insects and nectar, and utter a 'chip-chip' note as they move through the scrub. They also have a babbling song which, although not very musical, is quite a cheerful sound. There is also another call—a loud, 'chu-toyt'.

The nest usually is built down low; with little or no attempt at concealment, it is suspended in the leafy twigs of a drooping branch. A bush or tree growing in a dry creek-bed or on the bank, is frequently chosen to build in. Fine strips of bark, grass stems and plant-down are matted together with cobwebs, and although the nest is not hidden away, it usually blends remarkably well with the surrounding foliage.

Two creamy-white or fleshy-buff eggs form the clutch, and these are spotted or clouded with dull reddish-brown. Nesting will take place at any time after good rains, but from July to November are perhaps the most common breeding months.




The Yellow-plumed Honeyeater, *M. ornata*, which is being named the Mallee Honeyeater in some publications, is restricted to the mallee districts at the junction of South Australia, Victoria and N.S.W., except for a population in south-western Australia, where these birds are more catholic in their choice of habitat.

They are vigorous, quarrelsome honeyeaters, squabbling amongst themselves and making concerted attacks on any other species that is unfortunate enough to join them in their feeding. They have loud warning calls, which are taken up by the whole flock, when a predator is sighted.

All the notes and calls of these honeyeaters are loud and inclined to harshness. They are one of the first birds to be heard announcing the new day—often starting up well before dawn. Yellow-plumed Honeyeaters also have a song-flight, in which they dash vertically into the air for twenty or thirty feet, calling loudly at the peak of the rapid climb and as they descend more slowly.

The diet of these birds is largely honey, obtained from the blossoms of various eucalypts, but this is supplemented with spiders and insects.

WHITE-STREAKED HONEYEATER 7in.

A frail cup-nest is built; composed of grasses and plant-down, it has a lacy look and can often be seen through. It is suspended from a few twigs by means of cobwebbing and is usually below twenty feet in height.

Two, or sometimes three, eggs are laid which are pale salmon-pink or white, marked with small brown and red spots over grey. The breeding season is related to local conditions to some extent; July and March are the extremes but August to November appear to be the main nesting months.

The Yellow-fronted Honeyeater, *M. plumula*, is found over a wide area, from coastal north-western and central Western Australia across the Centre to east-central Queensland. Southwards they extend at times to N.S.W. as far as Griffith, and even less frequently these honeyeaters have been recorded in Victoria.

This is a species favouring fairly dry areas, which carry mallee and similar scrub, and they also may be seen in open, dry forest but not heavy-forest country. Single birds or pairs may be seen, and in an area of heavy eucalypt blossom, flocks of these birds may be found busily raiding the flowers for nectar.

Attention may be drawn to the birds over a good distance by the clear calls of 'it-wert, it-wert'. Another common whistling call is 'swe-eet'. A 'towering' flight is performed by this bird as it flies rapidly and erratically into the air twenty feet or so above the scrub, and then descends more slowly. On alighting, low, rather guttural calls are uttered. Some observers have heard the male of this honeyeater 'sing beautifully with canary-like notes when perched on a tall shrub'.

A cup-nest is built, and usually suspended from a few twigs at the end of a leafy branch; the site is generally only a few feet from the ground. Grasses mixed with plant-down, and woven together with cobweb, are used to construct the nest.

Two pale salmon-coloured eggs are laid which have small spots of chestnut, which tend to form a vague zone at the broader end. The breeding season is from August to December and sometimes later.

The Yellow-tinted Honeyeater, *M. flavescens*, is also called the Pale-yellow Honeyeater in some publications. This species is confined to the tropical north of the continent, although they have not been recorded on Cape York Peninsula. They are a tropical counterpart of the familiar White-plumed Honeyeater, and resemble them in behaviour and voice. Yellow-tinted Honeyeaters are fairly common throughout their range, and at the height of the honey-flow in a particular area, the blossoming eucalypts will be crowded with eagerly feeding birds. Insects of various kinds are also eaten by this species.

They frequent open country carrying scattered timber and scrub, which would explain their absence from Cape York with its dense high-rainfall forests. In the heat of the day Yellow-tinted Honeyeaters drink and bathe frequently, and consequently are seldom found far from water.

The cup-nest is made of bark, grasses and plant-down, woven together with spider-webbing. The usual site is in the thin twigs of a sapling, where the nest will usually be suspended from about six to twelve feet from the ground.

Two eggs is the normal clutch, and these are pale salmon-pink, sprinkled with reddish-brown spots and pale grey, mainly towards the larger end.

The birds will breed at almost any time after good rains, but the height of the nesting season is usually from July to November.

The White-plumed Honeyeater, *M. penicillata*, is found throughout most of the continent, except for parts of the far north. This honeyeater which is so widespread in southern and eastern Australia, is much more locally distributed in the west. In Adelaide the species frequents the street-trees and suburban gardens as commonly as in Melbourne. It is noticeable that the western birds are a richer yellow-green colour.

They are typically birds of the coastal scrub and light forest areas, and are also found in the well-watered, lightly-wooded country of the interior. These birds bathe frequently, and may visit the water a number of times a day to splash and drink.

Insects supplement their main diet of nectar which is obtained from many kinds of eucalypt. White-plumed Honeyeaters are vigorous and noisy birds, dashing about in swift erratic flights through the foliage and from tree to tree. These birds have the habit, particularly in the spring, of dashing high out above the tree-tops or scrub, loudly and even fiercely calling 'chick-o-wee, chick-o-wee-chick-o-wee'. They are also one of the first species to sound the alarm at the appearance of a predator. This alarm call is a high-pitched and very rapid call which sounds something like 'pe-pe-pe-pe-pe'.

The nest is a neatly-made cup, composed of bark-fibres, grasses and plant-down, bound together with cobwebs or occasionally wool or hair. It is a thin-walled structure, and can sometimes be seen through from below. The usual site is in the thin twigs at the end of a leafy branch, at any height from a foot or two up to fifty feet or more.

Two, or sometimes three, eggs form a clutch, and these are white to pale pink, freckled with reddish-brown and grey, usually towards the larger end. The breeding season is from June to December but may sometimes extend further.

The Yellow Honeyeater, *M. flava*, is found on the Cape York Peninsula and northern Queensland in the gulf country. It ranges down, east of the Dividing range to about Mackay. The distribution of the species in the Northern Territory is not well known, and there may not even be a resident population in that State.

They are largely coastal honeyeaters, and are seldom found far from water, even further inland. This handsome golden-yellow bird is considered by some observers to be one of the most attractive of our tropical honeyeaters.

Yellow Honeyeaters are noisy, often attracting attention

WHITE-GAPED HONEYEATER 7in.

to themselves with their loud ringing calls which have been described as 'cheweer-cheweer-cheweer-burrp-burrp' and 'wee-ear': another frequent call is 't-weet'. When they are busily feeding a quieter 'tut-tut' note will be heard.

In pairs or, when the trees are in full bloom, in flocks, these honeyeaters follow the honey-flow and will quite frequently descend on gardens. They supplement their honey-diet with arboreal insects.

A shallow, cup-shaped nest is built, with palm-fibres being the most favoured material. This is woven about a few strips of bark and matted with cobwebs. The nesting-site is usually in a small bush or sapling, at heights from about six or eight feet to thirty feet from the ground.

Two eggs are laid which are white or pinkish, heavily blotched with reddish-brown and paler grey markings. There is a tendency for the markings to zone at the larger end. The breeding season is from August to November.

The White-streaked Honeyeater, *Trichodere cockerelli*, is confined to the Cape York Peninsula to about as far south as the Archer and Claudie Rivers.

These birds are extremely active, even compared with the other honeyeaters. They are also vociferous in the extreme, and as they dash about in the foliage these birds present the watcher with little opportunity of observing them closely.

Because of their limited distribution to an area not frequently visited, little has been recorded of these honeyeaters' habits. Their voice is the most obvious thing about them, with a variety of notes and calls, including a loud scolding, a sound 'rather like a tight string being twanged on a box' (Officer) and a four-noted, sweet whistling call. Their diet is typically 'honeyeater': nectar and insects procured amongst the foliage and blossoms.

A nest is constructed of grass, plant-fibres and light twigs, bound about with cobwebs, and built low in a small bush. Two eggs is the normal clutch; they are white to pale salmon, with darker red and grey spots. The breeding season is usually from August to November.

The White-gaped Honeyeater, *Stomiopera unicolor*, is another tropical honeyeater, found from Broome in Western Australia to Townsville on the east coast of Queensland. The bird also occurs on Melville Island.

These are rather plain, greyish honeyeaters but make up for their lack of colour by being one of the most pugnacious and bullying of all the *Meliphagidae*. They have a loud, far-carrying voice, with a variety of calls and notes. A vigorous 'whit-o-we' is one frequent call and they also utter a rather sparrow-like 'chip-chip-cherp'.

They are usually found near creeks and rivers and show a distinct predilection for the large river melaleucas, (cajeput). In some districts they visit country gardens quite readily in search of food. Their diet is wide for a honeyeater, consisting of nectar, insects and both native and domestic fruits.

The nest is constructed of thin strips of bark (melaleuca bark generally being utilised) and dried grass, all bound together with cobwebs. The nesting-site is usually in a bushy tree, at no great height.

The clutch consists of two eggs which are fleshy-white, spotted and blotched with reddish-purple. The breeding season is from August to January.

In the genus *Xanthotis* there is but one species, a honeyeater of the tropics. The Tawny-breasted Honeyeater, *Xanthotis flaviventer*, called the Buff-breasted Honeyeater in some publications, is confined in Australia to the Cape York Peninsula, where it ranges south to about the Archer and Claudie Rivers. Outside the continent, this species also inhabits New Guinea and the Aru Islands.

Some observers claim that this bird is 'not as assertive' as most other honeyeaters, but others indicate that the bird is seldom quiet (Officer). It attracts attention with a great variety of notes and is a very active feeder amongst the blossoms.

In parties or individually, they forage through the foliage in search of nectar-bearing flowers, insects and small fruits. These large-billed honeyeaters are almost reminiscent of female rifle-birds, so heavy is the bill.

A well-made cup-nest, of melaleuca and eucalyptus bark, is lined with fine rootlets or bark-fibres. It is usually suspended from twigs in a bush or tree, at heights from a foot or two up to fifty feet.

Two eggs are laid which are pinkish-white and spotted with brownish-red which varies considerably. The breeding season appears to be from November to January and later.

The Crescent Honeyeater, *Phylidonyris pyrrhoptera*, is distributed from about the Newcastle area in N.S.W. down to Victoria, South Australia and Tasmania. These honeyeaters also inhabit Flinders Island (and other islands in the Furneaux Group) and Kangaroo Island.

These handsome birds frequent forest, mallee and coastal scrub areas. In Tasmania in particular, they are found in high country and they also frequent gardens in various parts of their range. They tend to visit their more domestic haunts in winter, seeking fruits, insects and nectar in the garden shrubs.

Crescent honeyeaters are loud-voiced birds, with a number of ringing notes which are sometimes strung together to make a song. The best known and most easily described call is a powerful 'egypt' uttered once, or briskly a number of times. They will often sit for a few moments on some high, exposed dead branch, slimly outlined against the sky, and 'sing' their rich collection of calls and whistles.

It is a sociable species, particularly in the winter; but numbers of birds may even be found nesting in a relatively small area. The nest is made up of grasses, bark-strips, wool, and sometimes a few twigs. It is usually placed near the ground in a thick bush.

Two, and sometimes up to three and four, eggs are laid which are pale flesh-colour to salmon-pink. They are spotted and blotched with chestnut and grey. The breeding season is from July to December.

TAWNY-BREASTED HONEYEATER 7¼ in.

CRESCENT HONEYEATER 6in.

The genus *Meliornis* contains two strikingly-coloured black and white honeyeaters with yellow wings. They have both been put into a different genus by some ornithologists (for example, Serventy and Whittell in *Birds of Western Australia*), and named *Phylidonyris*.

The Yellow-winged Honeyeater, *Meliornis novae-hollandiae*, is found from south-eastern Queensland down to southern Victoria, southern South Australia, Kangaroo Island and Tasmania. There is also a population of these birds in Western Australia from the vicinity of Moora down to Israelite Bay on the south coast.

In some publications the Yellow-winged Honeyeater is sometimes given the name New Holland Honeyeater as its 'official' name, and it is also called White-bearded Honeyeater.

Typical habitats of this honeyeater are heathy scrublands, open forest, coastal areas of ti-tree, banksia and similar growth; they also frequent swampy vegetation and sometimes the thicker brush and trees along creeks and rivers.

This species visits gardens quite freely, especially during the winter, in search of fruits and flowering shrubs. As well as fruit and honey, this honeyeater indulges in rather fly-catcher-like techniques to capture insects.

They are a very active species and very strong, swift fliers. Various loud whistles will be heard from them, and a chattering warning call when a cat or other predator appears on the scene.

If one intrudes upon their immediate nesting area they become very excited, dashing about with great rapidity and calling loudly. A number of neighbouring Yellow-winged Honeyeaters might be attracted to the scene also, and the birds land, still shrieking, in the low branches about one's head, between dashing flights. As the intruder departs they will accompany him off their 'property', still objecting vehemently.

A nest is built, of strips of bark, rootlets, twigs, grass and plant-down. Any or all of these might be used, and I have found that a number of nests in the same vicinity might vary in their materials.

Two or three eggs are laid which are pinkish-buff, with red spots and blotches and a few grey markings, tending to form a zone towards the larger end. The breeding season is very flexible, nests being found at almost any time (for example, April in Western Australia), although the peak of the breeding usually takes place between June and January.

The White-cheeked Honeyeater, *M. niger*, is, at first sight, a very similar-looking bird to the above species, especially when seen flashing through the scrub in a blur of black, white and golden-yellow. If one can get a look at the eye, the white iris of the Yellow-winged Honeyeater immediately serves to distinguish the two species. The pattern of white patches on the head is also quite different.

White-cheeked Honeyeaters are found from coastal Queensland in the vicinity of Cairns, to south-eastern N.S.W. They also inhabit a portion of Western Australia from the Murchison River district south to Israelite Bay. Heathy country, light coastal scrub and open forest are the typical habitats of this species.

In their general behaviour—their vociferousness and rapid 'hedge-hopping flights'—these birds resemble the Yellow-winged Honeyeater. Also indicating how closely related these two species are, is the case of cross-breeding between the two species. It was recorded in Western Australia in 1953 and the pair successfully reared two young.

One distinctive habit they do have is to indulge in rocketing, towering flights above their nesting territory. At the peak of their climb they turn and plummet down with closed wings, flattening out at scrub-level for a short glide to their perch. A rather squeaky, unmusical 'chip-choo-chippy-choo' is the common call.

A low nesting-site is usually chosen, in thick foliage or almost on the ground in a tussock. A nest of grass, soft bark and rootlets is built, and it is frequently lined with the soft brown 'banksia-fur' from the cones. Two eggs are laid which are salmon-pink with a zone of a few pink and grey spots. The breeding season is from July to February.

The Bell-miner, *Manorina melanophrys*, is distributed from the McPherson Range in southern Queensland to Victoria about as far as the Glenelg River in the Western District.

These greenish honeyeaters, known to most people as Bellbirds, have the well-known bell-like 'pink-pink' or 'ping-ping' call. They live in colonies remaining in one particular place throughout the year. As the numbers increase beyond the food resources of the area, a number of birds will leave to settle elsewhere.

Light to medium-forest country, scrubby thickets with eucalypt saplings, and the growth along water-courses, are favoured habitats. In fact, most colonies will be found within a short distance of a creek or river.

The diet of these birds is made up mainly of insects,

YELLOW-WINGED HONEYEATER 7in.

WHITE-CHEEKED HONEYEATER 7 in.

although a little nectar is taken. They are not particularly active by honeyeater standards, and being leafy-green in colour, are surprisingly hard to pick out at first against against the gum leaves. Bell-miners tend to call in unison, so that there floats down from the trees an almost continuous, but uneven, ping-pinging. At first this is a pleasant rather cool sound, but it can become a little wearing after a few hours.

The species is most pugnacious, usually driving all other honeyeaters from the immediate feeding grounds. Other birds are bullied also. I have watched bell-miners pestering a kookaburra for example, for half an hour at a time. The honeyeaters frequently land on the larger bird's back or shoulders to give it a quick buffet.

A cup-nest is built, composed of grass, bark, twigs and leaves. Nests vary considerably in construction, some are quite solid structures of leaves and cobweb, whilst others might be almost transparent cradles of cobwebs, and plant-down with a few 'struts' of grass stems.

The nesting-site is usually the outer twigs of a thin branch in a sapling or bush, and is seldom far off the ground; twenty feet or so would be an unusually high nest. Occasionally, nests have even been found in reed-beds.

Two or three, rich flesh-coloured to buff-coloured eggs are laid, which are spotted with reds, brown and purplish-grey, usually concentrated towards the larger end. The breeding season is from June to November and sometimes later.

The genus *Myzantha* contains the three, grey and fairly large honeyeaters called miners. These garrulous honeyeaters are common in various parts of their ranges, and have, in the main, adapted well to encroaching settlement.

Some authorities have named the genus *Manhorina* and taxonomic opinions also differ on the status of the Dusky and Yellow-throated Miners. In Western Australia, the two birds are considered to be geographic races of the one species, with the various forms merging into each other. On the other hand, the two species are found in eastern mallee areas, overlapping in range, but apparently remaining differentiated and not interbreeding.

The Noisy Miner, *Myzantha melanocephala*, is found throughout most parts of eastern Australia, South Australia and Tasmania. It is absent from the tropical jungles and rain-forests of Cape York Peninsula.

These solidly-built grey birds are, as their vernacular name suggests, uncommonly noisy. They have harsh calls such as 'quoy-quoy', 'kik-wick' and similarly sharp sounds. Noisy Miners are one of the first birds to give warning calls at the appearance of a cat or hawk or other danger. The species is plentiful, and frequently lives near human habitation in country areas. They respond in a highly excited manner to anybody making a squeaking sound. Insects and fruit rather than nectar form the bulk of their diet. They can quite frequently be seen feeding on the ground, where, however, they do not linger, but keep flying back to the safety of a nearby tree.

A relatively solid nest is built, of twigs, coarse grass and strips of bark. It is lined with rootlets and finished off inside with a soft layer of wool, fur or hair. No particular effort seems to be made to conceal the nest, and it may be in a low bush, a sapling or a higher tree.

Two, three or sometimes four, eggs may constitute a clutch. These are varying shades of pink, well speckled with chestnut and purplish-grey. The breeding season is from June to January.

The Yellow-throated Miner, *M. flavigula*, is found through the interior of the continent generally, reaching the coast in north-western Australia. These honeyeaters are also found on Melville Island. Although geographically the ranges of this bird and the Noisy Miner overlap, they are very seldom seen together. The yellow-throated bird is found in the drier, hotter parts of the country, where its relative does not venture.

In general behaviour, the two birds are very similar, although the Yellow-throated Miner is considered to be less noisy and not as bold. They sometimes become fairly tame however, and visit the gardens and surroundings of homesteads. Blossoms containing a good supply of honey are eagerly visited but a large number of insects are also eaten and some native fruit and garden fruits. The harsh calls of 'quoy-quoy' and 'kwick-wick' are much the same as the Noisy Miners'.

A nest of twigs, plant stems and grass is built in a low bush or higher in a sapling, occasionally up to thirty feet from the ground. The nest is lined with soft material such as fur or wool.

The normal clutch is three eggs, but two or four and more rarely five, are laid, which is a very large clutch for a honeyeater. The eggs are a handsome salmon-pink with darker red spots and grey markings, usually towards the larger end. The breeding season is from July to December.

Yellow-throated is perhaps not a suitable appellation for this bird, as it is about the most difficult diagnostic feature

BELL-MINER 7in.

to see in the field. The white rump, which the other two miners lack, is much more apparent and indeed some publications name the bird 'White-rumped Miner'.

The Dusky Miner, *M. obscura*, is confined in eastern Australia to the mallee country around the junction of N.S.W., Victoria and South Australia. In Western Australia they are more widely distributed, but according to the opinion of Western Australian authorities, this species is inseparable from the Yellow-throated Miner. (See introduction to this genus.) The *obscura* type, however, is inclined to be a south-western bird and the *flavigula* type ranges over the rest of the State.

The nest and eggs of the Dusky Miner do seem to be inseparable from those of the Yellow-throated Miner. From August to November are the chief breeding months in the south-west, extending to February in the east of Australia.

The genus *Anthochaera* contains the three wattle-birds, only two of which actually have wattles on the face. They are strange birds, very reptilian in appearance, with flat heads and rather scaly-looking plumage. The resemblance to something saurian is enhanced by their flexible head and neck movements, and the twisted positions the birds assume in probing into hanging blossoms.

The largest of the genus, the Yellow Wattle-bird of Tasmania and the Bass Strait islands, used to be shot constantly for food all the year round in a more bucolic age. Now there is a controlled open season and although the species is not as common as it was once, they are holding their own. The birds become fat and well flavoured after the autumn frosts, when they will weigh between five and six ounces. Yellow Wattle-birds have the habit, unfortunate for themselves, of returning almost immediately to the same tree after being frightened off by a shot. The Red Wattle-birds of the mainland, also used to be shot in large numbers for the table, but the species is now entirely protected.

The Little Wattle-bird, *Anthochaera chrysoptera*, is distributed from southern Queensland down to Victoria and South Australia. They also inhabit Tasmania, Kangaroo Island and the south-west of Western Australia. Various habitats are frequented, such as forest, thick scrub and lighter scrub interspersed with areas of heath. On the whole, they are found along the coast and immediately behind it, there are; however, few records of these wattle-birds further inland.

In pairs and frequently in small gatherings, these honeyeaters move about a good deal, in search of flowering trees and native fruits. Banksias are particularly favoured by these birds. Insects supplement their nectar and fruit diet.

These birds are very pugnacious, and indulge in spectacularly fast, twisting and turning flights through the branches in pursuit of other species. Having driven off the interloper, the wattle-bird may land on a branch, and throwing back its head, let out the most extraordinary cacophony of slicking-slacking sounds and rattling noises. Their cries sound like 'kuk-ack-kook-uk-ack-cukack' and variations on this harsh theme. The sounds are rather amusing and one can become quite attached to the garrulous birds, although some observers have described the birds' calls as unattractive.

At first sight, this species might easily be confused with the Red Wattle-bird, even though the latter is considerably larger. They can be distinguished by the rusty colour showing in the open wing of the Little Wattle-bird, and its lack of wattle or yellow on the belly.

The nest is made of thin twigs, with a lining of bark-fibres or grass. The usual site is in the fork of a low tree or bush. The clutch is variable. In Western Australia only one egg is laid, whilst in the east, two eggs are usual. It is interesting that out of the two, only one hatches in many cases (Hindwood). In Tasmania three eggs are sometimes found in a nest. The eggs are pinkish, spotted and blotched with chestnut and purple.

Spring and summer are the peak breeding seasons, but these honeyeaters will breed at almost any time of the year given suitable conditions. They are multi-brooded, sometimes raising consecutive young in the same nest.

The Red Wattle-bird, *A. carunculata*, is found from Queensland south of Brisbane to Victoria and South Australia. They also inhabit Kangaroo Island and there is a separate population in the south-west of Australia. These birds are our largest mainland honeyeaters, exceeded only by the Yellow Wattle-bird of Tasmania.

They may be seen in pairs, but often move about in small flocks. It seems clear that they are nomadic, but whether fortuitously following the honey-flow or with some seasonal pattern, is not clearly known at the moment. There does not appear to be a winter movement out of the scrub into more open heathlands.

Blossoming eucalypts are eagerly visited and banksias are particularly sought out. The racket made by a party of these birds, feeding and squabbling in a grove of trees, is quite remarkable.

Their hoarse cries sound like 'tobacco-box, tobacco-box', often repeated a large number of times. Some observers have claimed that they have infrequently heard a more musical song.

A rather untidy nest is built, of twigs and grasses, and lined with bark-fibres, feathers or wool. It is built into an upright fork, at maybe four or five feet, or up to forty feet from the ground.

Either two or three eggs are laid which are a pinkish-buff, with reddish-brown and purple spots, mainly at the larger end. The breeding season is from July to December.

The Yellow Wattle-bird, *A. paradoxa*, is found throughout most of Tasmania and also on King Island and other islands in Bass Strait.

This is a common species, in spite of being shot for the

table in great numbers in the past, both in and out of 'season'. They are now protected except for a short period outside the breeding months.

In forest, scrub and coastal heath intersected with trees, these honeyeaters may be seen in pairs or larger parties. The diet of this honeyeater is nectar, supplemented with insects, and the bird is seldom found far from eucalypts of some variety.

Like the other species of wattle-bird, this one has the most curious and raucous collection of calls. They are noisy birds and a number of them racketing on at once, with their 'gurgling-coughing-water running out of a bottle-vomiting' sounds, is a most extraordinary medley of both harsh and guttural sounds. Considerable physical effort by the bird is required to produce these sounds: the head is thrown back and jerked forward to spit out the calls, the throat is distended, the lanceolate gular feathers vibrate, and the bird's body vibrates with the exertion.

A large, rather loosely-made nest is built, of twigs and bark, with a lining of wool and fine grass. It is generally placed in the upright forks of a branch at heights between three or four and forty feet from the ground.

The two or three eggs laid are salmon or buff-pink, spotted with reddish-brown and grey. The breeding season is from July to November.

The Spiny-cheeked Honeyeater, *Acanthagenys rufogularis*, is found throughout most of Australia, except that it avoids heavily forested country. The species is absent from the extreme south-west corner of the continent, the Kimberleys and the more northern parts of the Northern Territory.

They are bold birds, and also quarrelsome, both amongst themselves and towards other species. This honeyeater might be found feeding in almost any type of vegetation, and to their nectar-diet is added insects and fruits of various kinds.

One of the calls of this relative of the wattle-birds, is a rather wattle-bird-like 'quock' and also 'a loud challenging call'. A plaintive and rather reedy trilling has also been recorded. If they are feeding quietly through the foliage the odd clicking sound will be heard.

A nest of grasses and rootlets is constructed and bound together with cobwebs. It is lined with some soft material such as wool or fur. Almost any kind of a bush or tree may be selected and the height of the nest also varies from a foot or two, up to fifty feet from the ground.

Two, or more rarely three, eggs are laid, which are pale olive-green, with spots and blotches of brown and purplish-grey. The breeding season is from August to January.

The Blue-faced Honeyeater, *Entomyzon cyanotis*, is distributed from the northern Kimberleys in Western Australia across to Cape York. It ranges down eastern Australia to the Murray River system and is also seen in various parts of Victoria. It is worth noting that the immature of this species has green skin about the face and not blue.

This widely-distributed honeyeater is seldom seen far from water, where it feeds in various trees on nectar, insects and native fruits. They have adapted well to encroaching civilization, and indeed, have taken advantage of orchards to the extent of becoming a pest in some areas.

The Blue-faced Honeyeater has a very poor voice, mainly uttering a 'queet' sound. They also have a very human-sounding whistle, which seems to be heard only about dawn and sunrise. It sounds like a person trying to attract attention, and the call is repeated over and over, until one feels like jumping out of bed and shooting the bird. They can be called up and made very excited by a squeaking sound, and a number of them will flock to the scene, all scolding loudly with sounds like those of the Noisy Miner.

On the few occasions that the bird builds its own nest, it constructs a flattish saucer-shaped structure of bark and twigs, lined with bark-fibres and grass. Mostly, however, they utilize the old nest of such species as mudlarks, babblers and apostle-birds. This honeyeater will be found nesting in a bush or tree, at heights ranging from about ten to twenty feet from the ground.

The clutch consists of two, or occasionally three, eggs which are various shades of salmon-pink to fleshy-buff, marked with chestnut and purplish-brown. The breeding season is from June to January.

NOISY MINER 10 in.

YELLOW-THROATED MINER 10 in.

DUSKY MINER
9½ in.
SPINY-CHEEKED HONEYEATER
10in.
RED WATTLE-BIRD
14 in.

LITTLE WATTLE-BIRD
12 in.

The genus *Philemon* contains the five friar-birds; rather weird-looking birds with a quantity of bare dark skin about the head and high ridges along the top of the bill. Sometimes their heads have an almost vulturine aspect.

They look quite unlike the other honeyeaters but have the habits of the *Meliphagidae*, seeking honey and insects in blossoming trees, and being rather pugnacious.

The Helmeted Friar-bird, *Philemon yorki*, is found on the eastern coast of north Queensland, from Cape York to about Mackay. They also inhabit Thursday Island. They are pugnacious in their feeding territory, driving off other birds, particularly other honeyeaters in search of nectar. These birds are, however, shyer of humans than the other friar-birds, and are often difficult to observe closely.

The calls of this honeyeater are not particularly attractive, there are various harsh sounds, some of which sound like 'poor-devil', 'poor-devil' and 'sergeant-major'. This species is frequently found in the more swampy areas. Their diet is nectar, supplemented with insects and native fruits.

A bulky, cup-shaped nest is built, of bark and bark-fibres mixed with rootlets and usually lined with plant stems or fine grasses. The nest is suspended from thin forks of a branch, up to forty feet from the ground.

Three or four eggs are laid which are pinkish-white and have spots and blotches of reddish-brown and purplish-grey usually towards the larger end. The breeding season is from August to January.

The Melville Island Friar-bird, *P. gordoni*, is confined to Melville Island with perhaps a few visitors to the nearby mainland. They are similar in habits to the Helmeted Friar-bird and are probably indistinguishable (or almost so) in the field. Nothing appears to be recorded about this species, and neither the nest nor the eggs have been found by anybody who has recorded them. 'It seems reasonable to suppose it is in fact only a race of the Helmeted Friar-bird' (Officer).

The Silver-crowned Friar-bird, *P. argenticeps*, is found in tropical northern Australia, from the Kimberleys in the west to the vicinity of Townsville on the east coast. These birds are less common at the western end of their range.

In pairs or in flocks, Silver-crowned Friar-birds may be seen feeding on various flowering eucalypts and other trees and shrubs. These birds, unlike the Helmeted Friar-bird, may frequently be found in drier areas, providing there is a good honey-flow. The nectar-diet is supplemented with insects and native fruits such as figs. They are noisy birds, attracting attention as they feed, with unmusical squawks and warbles.

YELLOW WATTLE-BIRD 15 in.

A nest of bark-fibres, bark and cobwebs, is lined with grass and placed in a horizontal fork. It may be at any height, from ten or twelve up to thirty feet from the ground. Two pale pinkish-buff eggs are laid which have freckles of rust and purple-grey. The breeding season runs from August to January and sometimes as late as March.

The Noisy Friar-bird, *P. corniculatus*, is the most wide spread of the genus, being found from Cape York down to eastern and southern Victoria. These friar-birds are also the most bizarre-looking of the group, with their bare black heads and necks, and their collars of silvery feathers.

They are a very noisy and pugnacious species, and a flock of them is a lively sight, as they feed and squabble in a blossom-laden tree. These friar-birds also have the interesting habit of congregating in the branches of a dead tree to give joint performances of their raucous calls. Some of the cries sound like 'poor-soldier' and 'four-o'clock'.

The usual honeyeater diet of nectar and insects is followed. Native and domestic fruits are also eaten and on occasion, they will cause considerable damage to soft-fruit crops.

A cup-shaped nest is built of bark, wool, grasses and cobwebs, and neatly lined with dried grass or wool. It is usually suspended in the thin forks of a branch, at various heights, up to about fifty feet. Quite often, nests are built hanging over water.

Two, three or more rarely four, eggs may be laid. These are a rich salmon or buff-pink colour, with clouded markings and spots of chestnut and purplish-grey, chiefly towards the broader end. The breeding season is from August to December and sometimes later.

The Little Friar-bird, *P. citreogularis*, is found in northern, eastern and southern Australia, from the Kimberleys in Western Australia, to the Murray River basin in South Australia.

The typical habitat of this honeyeater is well-watered, open-forest country and park-like stands of timber. In pairs, but also in large parties when there is a good flow of honey, these friar-birds may be seen in all kinds of flowering growth.

Alone amongst the friar-birds, this species is sometimes heard to utter quite a musical song. They also can be very noisy in their feeding; squabbling flocks giving vent to harsh sounds of many kinds.

As well as honey, many kinds of native fruits and insects are eaten. It is worth noting that this so-called *little* friar-bird appears to be no smaller in the field than its relatives.

A cup-nest of bark and fibres, similar to that of the preceding species, is built. It is built into the fork of a tree or suspended from the end of a drooping branch, usually not up very high. The nest often hangs over water. From two to four eggs may be laid, and these are various shades of salmon-pink, with chestnut and purplish-brown markings. The breeding season is from August to February.

HELMETED FRIAR-BIRD 13in.

BLUE-FACED HONEYEATER 12in.

SILVER-CROWNED FRIAR-BIRD 10½in.

LITTLE FRIAR-BIRD 10in.

NOISY FRIAR-BIRD 13in.

MELVILLE ISLAND FRIAR-BIRD 13

## FALCUNCULIDAE

Shriketits, Crested Bellbird, Wedgebill, and Whipbirds

The family *Falcunculidae* contains a rather disparate group of birds. They do not fit particularly well together, but each genus fits less well anywhere else. The family relationship with other birds is also obscure. They crop up in various places in different classifications, and some taxonomists evade the question altogether! The birds in this group do have the head-crest in common but apparently little else.

The shriketits are handsomely coloured little birds, that spend their time in trees, seeking out insects. Frequently, in their hunt for food, they pull strips of bark off the trunks and branches, and the noise they make doing this is often what first draws one's attention to them.

### SHRIKETITS

The Eastern Shriketit, *Falcunculus frontatus*, is found in eastern Australia, from Cairns down to Victoria and then across to Adelaide. In Western Australia there is another population of shriketits that some ornithologists consider to be a separate species. Other opinions have lumped the two together as '*frontatus*'. (Serventy and Whittell, *Birds of Western Australia*.)

In pairs or parties, these rather chunky, active little birds move about the lighter forest country and scrub. They have taken well to the spread of civilization and agriculture. In orchard country they are considered to be a beneficial species, as the birds eat good numbers of codlin-moth larvae. They are not shy birds, and will allow a close approach. Shriketits have also taken to freely visiting gardens and tree-lined suburban streets.

They have strong conical, rather finch-like bills, and with quite a hook on the upper mandible. With this efficient digging and tearing instrument, they gain a good deal of their insect food by tearing up strips of bark and breaking open rotten wood. The sound of all this industry is often quite loud, and sometimes can be heard before the birds are seen. They are often nick-named the 'Barktit', because of this habit.

One of their calls has been likened to the phrase 'knock-at-the-door, knock-at-the-door' repeated frequently. These birds will, however, usually be heard calling in a high-pitched piping, and they also mimic the calls of other species. It is interesting that in southern Queensland the voice of the Eastern Shriketit is quite different from the birds in Victoria. In the far north the calls are even more dissimilar, being less varied and less powerful. This is a phenomenon which may be observed in a number of north/south species.

The nest is beautifully built, and it is unusual in that the bird frequently uses green, living bark, which it is able to tear away from the tree with its strong bill. The bark and bark-fibre are matted together with cobwebbing and a lining is added of fine bark-fibres and grass. The usual site is in the thin upright twigs right at the top of a eucalypt. Frequently the leaves above the nest will be nipped off by the birds, and this is presumed to be a method of decreasing wind resistance in the lofty, swaying twigs.

Shriketits are very responsive to imitations of their calls, and the nest may often be discovered by calling up a bird and then following it back to its nest. Two or three eggs are laid which are white, marked with dark olive and a paler grey. The breeding season is from August to December.

The Western Shriketit, *F. leucogaster*, is considered by some ornithologists to be only a geographic variant of the Eastern Shriketit (Serventy and Whittell). In colour, this bird differs in having a white abdomen, between the yellow breast and under tail-coverts. They are confined to the south-west corner of the continent.

These shriketits appear to be similar in their habits to the *frontatus*, and have the same habit of noisily tearing up strips of bark on tree-branches and trunks, in search of insects and spiders. The documentation of the two birds' voices suggests that they are quite different. The western bird having a soft, clear 'ko' or 'koo', and also a plaintive whistling note sounding like 'poo-oo-pee-ee'.

The nest is a very neatly-made deep cup of bark and fibre, matted together with cobwebs. It is lined with grass, and like the eastern bird's it is usually built in the highest twigs of a eucalypt.

Three eggs is the usual clutch, and these are white, speckled with dark brown and grey, particularly at their broader ends. The breeding season is from August to January.

WESTERN SHRIKETIT 7in.

EASTERN SHRIKETIT 7¼in.

The Northern Shriketit, *F. whitei*, is found in north-western Australia, where its range extends to some extent into the Northern Territory. Little seems to have been recorded about this species. So far as is known, their habits appear to resemble those of the other shriketits. They are considered by some taxonomists to be inseparable from the other species of shriketit.

A very neat, cup-shaped nest is built, similar in materials and situation to the eastern and western birds. Two white eggs are laid, and these are marked with spots of dark olive over paler grey markings. The breeding season is from August to December.

## CRESTED BELLBIRD

The Crested Bellbird, *Oreoica gutturalis*, is in a genus of its own, and is a difficult bird to relate closely to any other species. They occur in many parts of inland Australia where suitable habitats occur, and extend to coastal districts in a few areas. Dry country, with open woodlands, are the typical haunts of this species.

Their diet is mainly caterpillars, often of the hairy variety, which not many other birds will eat. The birds feed on the ground a good deal. As they hop through the grass and search under the low bushes for insects, they may be heard uttering a 'chuck-a-chuck-chuck' call.

From a high perch the Bellbird sings its ventriloquial and most melodious song. Starting with two slow notes, this phrase is immediately followed by three quick notes higher up the scale which sound remarkably like a distant cow-bell. One of the onomatopoeic names—'pan-pan-pallella'—describes this call very well.

A deep cup-shaped nest is constructed, of bark-strips, twigs, leaves and scraps of rubbish such as cloth. It is lined with dry grass and fine rootlets. The nesting-site varies, it may be in the upright fork of a low bush or tree, in the hollow on top of an old stump, or wedged behind a piece of bark that is curling from a tree-trunk.

The Crested Bellbird has the most unusual and somewhat bizarre habit of placing live caterpillars, usually hairy ones, around the rim of the nest and in the egg-chamber. The caterpillars are semi-torpid, probably having been well pinched in the bird's bill, so that they cannot get away. It is thought that these may be used as a food supply for the fledglings.

Two, three, or more rarely four, eggs are laid in a clutch. These are white, sparingly blotched with sepia and black. The breeding season is from August to December in most localities, but in the north Bellbirds breed as late as April.

## WEDGEBILL

The Wedgebill, *Sphenostoma cristatum*, is typically a bird of the inland, penetrating to coastal districts in very few areas. Like the Crested Bellbird, this species is crested, but lacks the handsome black and white face-markings. The white tip to the frequently-spread tail of the Wedgebill is another good field characteristic; the Wedgebill also runs on the ground, in contrast to the hopping Crested Bellbird.

They are ground-frequenting birds, and one of the characteristic species of the dry interior. These birds feed on insects and seeds, a few of which are obtained in the low scrub. They usually live in small parties, another characteristic that separates them from the unsociable Bellbird.

Wedgebills sing from a prominence, usually the top twig of a small bush. The four or five note song has been likened to such phrases as 'sweet-kitty-lintoff', and 'did-you-get-drunk'. The notes start low and quietly and become louder towards the end, rather giving the impression that the bird is coming closer. The final note has a distinctive ring about it, 'as if it were sounding from a rainwater tank'.

Wedgebills are rather wary birds, and even when singing bravely from the top of a bush, will not allow a close approach by a human. If undisturbed, the bird repeats its song over and over with irritating monotony. A communication call, and the sound most frequently uttered by the Wedgebills, is a simple 'wirry-chip'. On moonlit nights Wedgebills will often sing at night, and at such times in particular, the tune has a melancholy air in accord with the harsh and inhospitable surroundings.

A shallow, cup-shaped nest is built, loosely constructed of twigs, bark and grass. The cup is lined more neatly with bark-fibres and fine rootlets. Usually the site is an upright fork in a low scrubby tree or clump of saltbush and only a few feet from the ground.

The clutch consists of two or three eggs which are blue or greenish-blue, spotted lightly with black and greyish-purple, or sometimes only black. A less common type of egg has a ring of blackish spots and hieroglyphic-like markings about the broader end.

The breeding season is extremely variable, depending on local conditions. In the Barlee Ranges—mid Western Australia—eggs have been found in nests between February and May: whereas in other parts of the interior the Wedgebills have been found breeding between August and December.

## WHIPBIRDS

The Eastern Whipbird, *Psophodes olivaceus*, is found from north-eastern Queensland to Victoria. This species is an inhabitant of the brush-filled gullies and big scrub country.

They are extremely shy, and I have spent many a long hot afternoon in close proximity to these birds, and been rewarded with but a brief glimpse at infrequent intervals. Most of the time the Whipbird is on the ground searching through the dead leaves and other debris for insects, spiders and grubs.

The name is, of course, derived from its singular call, which is usually a duet. The male utters a rising, extended

whistle, which ends sharply and is followed immediately by the female's 'choo-choo', or sometimes 'choo-ee'. Early in the breeding season a number of pairs may indulge in concert.

A loose, but well-made cup-shaped nest is constructed, of twigs and rootlets, and is lined with finer materials. Two pale blue eggs are laid which have irregular markings of black and lavender-grey. The breeding season is from July to November or later.

The Western Whipbird, *P. nigrogularis*, is found in the south-west mallee areas of Western Australia. In some publications this bird is being called the Black-throated Whipbird. It was only in 1939 that this species was rediscovered; until that time ornithologists feared that the bird might have been extinct. The naturalist John Gilbert described the bird's song as harsh and grating and 'quite impossible to describe . . . so different from that of every other bird I ever heard or am acquainted with . . .'. The Western Whipbird also has a harsh, staccato song in addition to its better known 'whip-call'.

The bowl-shaped nest is constructed of bark and twigs and lined with finer material. The eggs are similar to those of the Eastern species. The breeding season is from about July to November.

## EPTHIANURIDAE

### Chats

The genus *Epthianuridae* contains the five chats, small fairly brightly-coloured birds that have something of the appearance of the warbler about them. Their habits, however, are different, as they are mainly terrestrial and frequent dry, sparsely-covered country or swampy terrain.

### CHATS

The White-faced Chat, *Epthianura albifrons*, is no doubt the best known of these lively little birds. They are widely distributed, being found wherever habitat permits. From southern Queensland, these chats range down the eastern states to Victoria, Tasmania, the islands of Bass Strait and Kangaroo Island. In South Australia they are absent only from the north-west. Another population is found in southern Western Australia, north to Point Cloates. Nomadic to a large degree, but also a resident in some areas, these birds frequent open country of many kinds: cultivated paddocks, areas of low, heathy scrub, and swampy localities, both inland and by the sea.

They are seldom still, and may be seen in pairs or small flocks hunting on the ground for insects or perched on low bushes and wire-fences. Both parent birds, if surprised at the nest, have a dramatic, injury-feigning display, where they flutter, apparently almost helpless, over the ground.

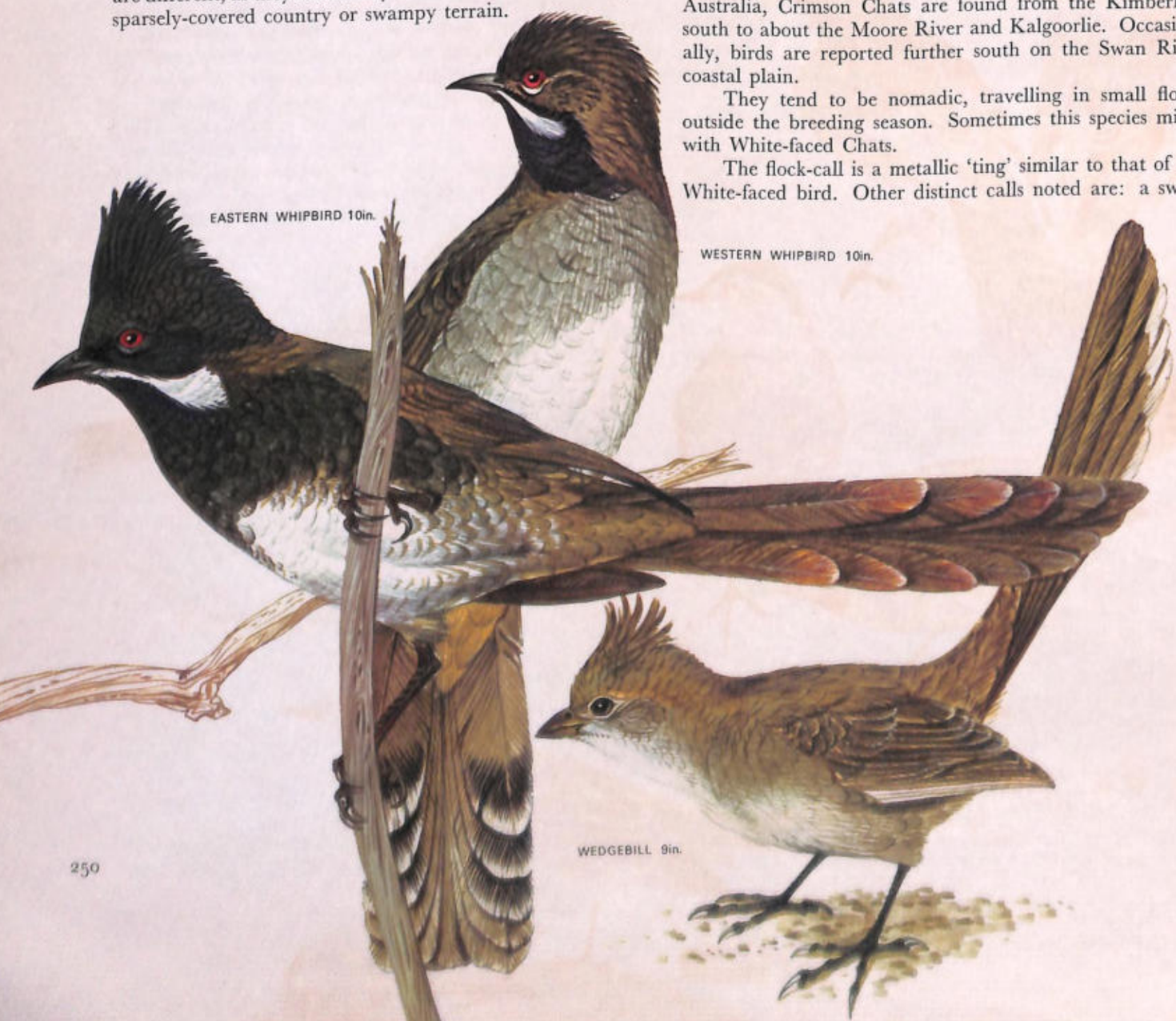
The nest is a neat cup of twigs, grass and fine rootlets, lined with hair or other soft material. It is usually concealed in a low bush, within a foot or two of the ground.

Three of four white eggs form the clutch, and these are spotted with reddish-brown, particularly about the broader end. July to December are the usual breeding months, but the birds will sometimes continue nesting into a mild autumn.

The Crimson Chat, *E. tricolor*, is distributed down eastern Australia, generally being found west of the Great Dividing Range. It ranges south as far as north-western Victoria and northern South Australia. In Western Australia, Crimson Chats are found from the Kimberleys south to about the Moore River and Kalgoorlie. Occasionally, birds are reported further south on the Swan River coastal plain.

They tend to be nomadic, travelling in small flocks outside the breeding season. Sometimes this species mixes with White-faced Chats.

The flock-call is a metallic 'ting' similar to that of the White-faced bird. Other distinct calls noted are: a sweet



shrill whistle, usually uttered three times; a mournful whistle in two syllables, uttered by the male in territory establishment; a low, truculent chatter, used in territory defence, and a plaintive hissing uttered in the injury-feigning display (Serventy and Whittell; S. R. White).

The nest is similar to the White-faced Chats', and is usually built into the top of a saltbush or a clump of trioda (in Western Australia), and similar low growth in other places. Both sexes share in the nest-building, incubation and rearing of the young birds.

Three, or sometimes four, eggs are laid which are white, spotted with reddish-purple. The breeding season is from October to December in the east, and from July to March in the west.

The Orange Chat, *E. aurifrons*, is distributed through western Queensland, western N.S.W., north-western Victoria, the Centre, and in Western Australia south of the Kimberleys to about Morawa and Eucla. Open, poorly-vegetated terrain is the favoured haunt of this bright little bird. Samphire flats around inland salt-lakes and coastal salt-marshes are typical habitats.

They are nomadic birds, travelling in small parties, and usually seen on or near the ground, hunting actively for insects. Their general habits are similar to those of the other chats. The flight and flock-call is a mellow 'cheek-cheek' or 'tseek-tseek'.

A neat nest of grass and fine twigs is lined with rootlets and placed in the shelter of a low bush or tussock. Three eggs are laid which are white, spotted, mainly at the larger end, with reddish-purple. Both birds brood the eggs and the breeding season is from September to February.

The Yellow Chat, *E. crocea*, appears to have either very limited distribution in three different places, or is spread across northern Australia without yet being recorded. The bird has only been recorded from the Fitzroy River, in Western Australia, the Alligator River in the Northern Territory, and the Norman and Fitzroy Rivers in Queensland.

These chats have had little recorded about them, and they appear to be more wary than the other chats, as

WHITE-FACED CHAT 4¼in.

CRIMSON CHAT 4¼in.

YELLOW CHAT 5in.

ORANGE CHAT 4¼in.

DESERT CHAT 5in.

suggested by the note '. . . when disturbed it seeks safety among the grasses'.

Like the other chats, these birds are largely terrestrial, where they may be seen foraging for insects. Their habitats are fairly open country with enough cover to shelter the birds. They have usually been recorded in pairs, but they may well prove to have the same flocking habit as their relatives. The call is said to be slight and simple.

A cup-shaped nest, made of grass, rootlets and perhaps a few twigs, is built in the shelter of a low bush or tussock.

Three eggs are laid which are dotted with purplish-red. The breeding season is from November to January.

The Desert Chat, *E. lovensis*, also is commonly known as the Gibber-bird. Some ornithologists consider this species to be in a different genus and name the bird *Ashbyia lovensis*. It is distributed from western Queensland and far north-western N.S.W. inland through South Australia to about the region of Oodnadatta.

In pairs and family parties, these birds frequent dry inland areas and are often found on the inhospitable gibber-plains. (These are flat or slightly rolling tracts of country, covered in round boulders, varying in size from pebbles up to rocks a couple of feet across.)

These chats are even more terrestrial than the rest of the genus, and very rarely perch in bushes. They have a habit of flying almost vertically into the air and singing 'whit-whit-whit' as they descend—a performance reminiscent of the Songlarks!

The cup-nest of small dry twigs and dead grass is neatly lined with rootlets and situated in a hollow on the ground.

Three white eggs, with reddish-brown spots about the larger end form the clutch. The breeding season varies considerably, as with many species of the inland: from May to October are common months, but nests may be found at any time after rain.

## NECTARINIIDAE

Sunbirds

There are one hundred and four species of sunbirds, spread from Africa (where the majority of them live), across southern Asia, the South-east Asian islands and out into a few Pacific islands.

### SUNBIRDS

The Yellow-breasted Sunbird, *Cyrtostomus frenatus*, is found in eastern Queensland from Cape York to about the area of Gladstone. Outside the continent this species occurs in New Guinea, the Admiralty Islands, Celebes, and the Solomon Islands.

The tongue of these birds is interestingly adapted to feeding on the nectar in flowers. The outer two-thirds of it is a double tube leading back to a 'trough' which leads to the esophagus. At its tip, the sunbird's tongue instead of being brush-tipped—like the nectar-sipping honeyeater's—is divided into two forks in some groups, and three in others.

Yellow-breasted Sunbirds are usually seen in pairs, flitting rapidly about the blossoms and foliage, almost hummingbird-like. Occasionally a bird will flick out from a perch to capture a flying insect. The chief call of the male is a thin 'tsee-tsee', and it also has a rapid melodious warble.

The nest of these birds is particularly interesting, being a very long elegant pendant of nesting material. It is suspended by its thin top, and bulges a little below halfway into the nesting chamber, and then has a long tapering tail below. The side-entrance is protected by quite a pronounced hood. It is constructed of bark-fibres, grass, dead leaves and similar materials and bound with cobwebbing. The

YELLOW-BREASTED SUNBIRD 5in.

egg-chamber is lined with plant-down and fine grasses. The natural site is a twig or branch, from which it is suspended, often close to the ground; but in settled areas the birds often build under verandahs and in similar situations.

Two or three greenish-grey, brown-speckled eggs are laid. The breeding season is from September to January or sometimes later.

## DICAEIDAE

Mistletoe-bird and Pardalotes

The family *Dicaeidae* contains the flowerpeckers and a local group rather distinct from the rest of the family, which are known in Australia as pardalotes.

Our typical flowerpecker is the Mistletoe-bird, which lives entirely on the sticky fruit of this parasitic plant. The Australian Mistletoe-bird shares its liking for these berries with several other members of the family found elsewhere in the South-east Asian islands and continent.

The somewhat aberrant diamond-birds or pardalotes differ in habits and appearance from the flowerpeckers. Their habits are reminiscent of the European titmice, as they forage through the twigs and leaves near the ground or in the high foliage canopy. They nest in holes, many of the species digging their own into banks of earth or sand. The name pardalote is derived from *Pardalotus* meaning 'spotted'—as the spotted lion or leopard is spotted.

### MISTLETOE-BIRDS

The Mistletoe-bird, *Dicaeum hirundinaceum*, is found throughout Australia wherever its staple diet of mistletoe berries is to be found. These handsome navy blue and scarlet birds are more common than many people imagine, but because of their small size and habit of feeding high in the trees, they are frequently overlooked. As well as the mistletoe berries, other native fruits are eaten and also a few arboreal insects are taken.

The call which might be heard up in the high foliage is 'wit-a, wit-a'. Various other brisk notes may be uttered and in addition it may use a warbling song, which sometimes includes mimicry of other birds' calls.

The stomach (more properly the muscular gizzard), which most birds have, is in this species, a simple tube, allowing large numbers of berries to pass directly and rapidly through to the intestine, and thence quickly on out of the body. When voided, the seeds often stick on the nearby twigs or branches, where they frequently germinate and flourish. The bird is thus largely responsible for the spread of the sixty or so varieties of mistletoe in Australia. There is no mistletoe in Tasmania, and consequently no Mistletoe-birds.

The nest is a very delicate and beautiful pear-shaped structure, with a slit-entrance in one side. Soft plant-fibres and plant-down are woven and matted with cobwebs into a felt. The dried-out castings of wood-borers or the dead brown heads of small flowers are often worked into the outside of the nest. It is suspended from the thin twigs of a leafy branch, at any height from three or four feet up to forty feet from the ground.

Three pure white eggs constitute the usual clutch. The breeding season is related to the fruiting of the mistletoe —usually from about October to March.

### PARDALOTES

There are six or seven species of pardalote (see the Striated Pardalote below), all of which are quite similar at first sight. They are a difficult group taxonomically, containing a number of closely related species and forms. For a more detailed treatment of some of these birds, Hindwood and Mayr's paper in Vol. 46 of the *Emu* is recommended. By many people, and in some publications, they are called Diamond-birds. They may be sorted to some extent into those which have spotted wings and upper parts, and those with white-striped wings and either black or striped crowns.

The Spotted Pardalote, *Pardalotus punctatus*, is distributed through most of eastern Australia down to south-eastern South Australia and Tasmania. There is a separate population in Western Australia from about Moora to the Stirling Ranges.

Usually in pairs, but sometimes in small parties, these tiny birds largely frequent the outer foliage of tall trees. Observation of them is fairly difficult, even through binoculars, as they often appear as little more than silhouettes.

The varied diet of these birds is obtained from the leaves and twigs. Scale-insects are a favourite food, thrips, lerps, spiders, moths and many others are also taken; thus the pardalotes are useful in taking many insects injurious to the trees.

A somewhat ventriloquial and monotonous call-note is uttered by these birds. It sounds like 'slee-ep, ba-bee' high-pitched on the first two syllables, the second two a semitone lower.

A nest of bark-fibres and similar material is placed at the end of a tunnel which the birds have excavated, usually in a bank but sometimes in the flat ground. Nests may also be found in a stump-hole or a hole in a tree. Both sexes help in the tunnel excavation, which may be up to two feet long, and the subsequent building, brooding and feeding duties are also shared. Four white eggs are laid, and the breeding season is from August to December.

The Yellow-tailed Pardalote, *P. xanthopygus*, is chiefly a species of the mallee country. It is found in the mallee areas of N.S.W., Victoria and South Australia, and also, quite separately in the mallee country of south-eastern Western Australia. The rather splendid name, *xanthopygus*, is derived from two Greek words, xanthos—yellow and pyge—rump.

Except that they necessarily feed in low scrub, these birds are similar in their general habits to the Spotted Pardalotes. The nest is more frequently drilled into the flat or gently sloping ground and both sexes probably work at this job. Four white eggs are laid and the breeding season is from August to November.

The Yellow-tipped Pardalote, *P. striatus*, is distributed from south-eastern Queensland to Victoria, south-eastern South Australia, Tasmania and Bass Strait islands.

This is quite a common pardalote, and particularly so in Tasmania. They are found in many types of light woodland and partly cleared country, feeding on insects of many kinds, mostly in the higher foliage.

The 'pick-it-up' call is distinctive, and is a good way of identifying this small bird which is often very difficult to see clearly. Another common call of this species is 'wit-e-chu'.

The nest is the usual domed construction of bark-fibres and similar materials. It may be placed at the end of a tunnel dug into a bank, or in the side of a rabbit-burrow. More frequently, however, this pardalote nests in a small hollow in a trunk or tree-limb, at heights up to about fifty feet from the ground. Four white eggs are laid and the breeding season is from August to December.

The Striated Pardalote, *P. substriatus*, is distributed throughout Australia south of the Tropic of Capricorn where suitable habitats allow. These birds spend most of their time hunting busily for insects in the high foliage, but they may sometimes be seen lower down, at scrub-level. The calls 'pick-wick', 'be-quick' and 'witt-a-witta' are often the only way of identifying these tiny birds silhouetted against the sky.

A domed nest is built, of bark-fibres and other plant material. It is seldom in a tunnel in the ground, more often being found in a hollow stump or a hole in a tree. Sometimes the birds may be found nesting in the crevices between the stones of buildings, and in thatched roofs.

The two species just dealt with, are stripe-crowned pardalotes, and a third stripe-crowned variety has lately been recognized. Known as the Eastern Striated Pardelote, *P. ornatus*, it occurs from south-eastern Queensland to Victoria. The wing spot of this bird varies from orange to red and only the third (with sometimes the fourth) primaries are edged with white.

There is evidence of some interbreeding where the species occur together, which gives rise to variations in the wing patterns.

The Forty-spotted Pardalote, *P. quadragintus*, is confined to Tasmania and King Island in Bass Strait. It does actually have about forty white spots on its wings. Like most pardalotes, it spends most of its time in the high canopy of various tall trees, where it is very active in pursuit of insects.

Recognition is made more difficult by the fact that these birds often feed in mixed flocks of Spotted and Yellow-tipped Pardalotes, and have no particularly distinctive call-notes. The call it does have is a high, sharp note followed by a lower one, but this tends only to 'sound like a pardalote'.

The nest is built in a small cavity in a tree-trunk or branch, at heights up to forty feet from the ground. Three or four white eggs are laid and the breeding season is from September to January.

The Red-browed Pardalote, *P. rubricatus*, is found in Queensland, the Northern Territory and north-western Australia, down to about the Gascoyne River. Elsewhere it ranges south to the interior of N.S.W. and Central Australia.

Usually in pairs, they frequent the higher, outer foliage of trees, in the typical pardalote manner. Their general habits are also similar to the rest of the genus. The call is somewhat ventriloquial; it is a soft monotonous 'chingajip', uttered by both sexes.

The nest is built in a chamber at the end of a tunnel excavated by the birds. It may be up to two feet long and is usually in a bank of earth. Bark-strips and fibres are used to make the globular nest, which is then lined with soft materials such as grass or paper-bark.

Three or four white eggs are usually laid, but only one or as many as four in a clutch have been recorded. The breeding season is from July to October as a rule, but may vary in the north and Centre.

The Black-headed Pardalote, *P. melanocephalus*, is distributed across northern Australia, from the Kimberleys in Western Australia to Queensland, and southwards to the Hunter River district in N.S.W.

This bird has all the *Pardalotus* characteristics. It keeps, in the main, to the high leaf canopy where various insects are busily sought out. The most characteristic call is an oft-repeated 'chip-chip, chip-chip', and the bird is often called the 'Chip-chip' where it is common.

In Brisbane, the birds have taken quite happily to living in the suburbs, where they may be heard and seen in gardens and tree-lined streets, and where they are one of the most common species.

A domed nest is constructed, of bark-fibres, grass and similar materials. This may be placed at the end of a tunnel excavated into a bank, in a small hollow of a tree-trunk, or even in suitable crevices in buildings. Four white eggs are laid and the breeding season is from June to December.

## ZOSTEROPIDAE

### Silvereyes

The family *Zosteropidae* contains the white-eyes, or silver eyes as they are better known in Australia. A number of closely-related forms and species range through Africa below the Sahara, southern Asia to the Pacific, north to China and Japan and south to Australia and New Zealand. The Grey-breasted Silvereye of Australia suddenly appeared in New Zealand in the 1850's and has thrived, even moving down to sub-Antarctic Macquarie Island.

### SILVEREYES

The most common and widespread species in Australia is the Grey-breasted Silvereye, *Zosterops lateralis*. It ranges from the Pascoe River in Queensland down to as far as the Eyre Peninsula in South Australia.

In pairs in the breeding season, otherwise in flocks which may comprise large numbers, these active little birds may be seen in open forests, scrub, gardens and orchards. They destroy large numbers of crop-damaging insects, although sometimes causing considerable damage themselves amongst ripe fruit.

A delicate but quite musical and sustained song is uttered by these silvereyes and the birds are also competent mimics of certain other bird calls. In winter the flanks of these birds become a much richer, tawny-buff colour than is present in the summer dress.

A neat, small cup-nest is built, of grasses, rootlets, horse-hair and other pliable materials, woven together with cobweb. It is placed in the horizontal or vertical thin twigs of a small tree or bush, at heights up to fifteen or twenty feet, but sometimes much lower.

Three, or more rarely four, eggs are laid which are a pale bluish-green. The breeding season is from September to January or sometimes later.

The Grey-backed Silvereye, *Z. halmaturina*, is now considered to be but a form of the previous species. They are a south-eastern species, coinciding with *lateralis* in many places. The Grey-backed bird ranges through the south-east of the continent, to Kangaroo Island, Tasmania and the islands of Bass Strait.

Its habits are closely similar to those of the Grey-breasted Silvereye. The eggs, nest and breeding season are also inseparable from that bird's.

The Western Silvereye, *Z. gouldi*, is found in Western Australia, from Shark Bay and Carnarvon across the south-west corner to Israelite Bay on the south coast. Sometimes these silvereyes are recorded further north—as far as Point Cloates.

This is one of the most common birds around Perth and generally throughout its distribution. Whilst they rid the countryside and farm-lands of many injurious insects, they also cause considerable damage amongst soft-fruit crops.

This bird is interesting in that it does not go through the pre-nuptial moult which the Grey-breasted Silvereye undergoes. In pairs during the nesting season, but often in considerable flocks afterwards, these small birds forage through the countryside and suburban gardens.

They build a similar nest to those built by the eastern silvereyes, and place it in the forked branch of a shrub or small tree. Two or three pale blue eggs are laid which have no markings. The breeding season is from August to December.

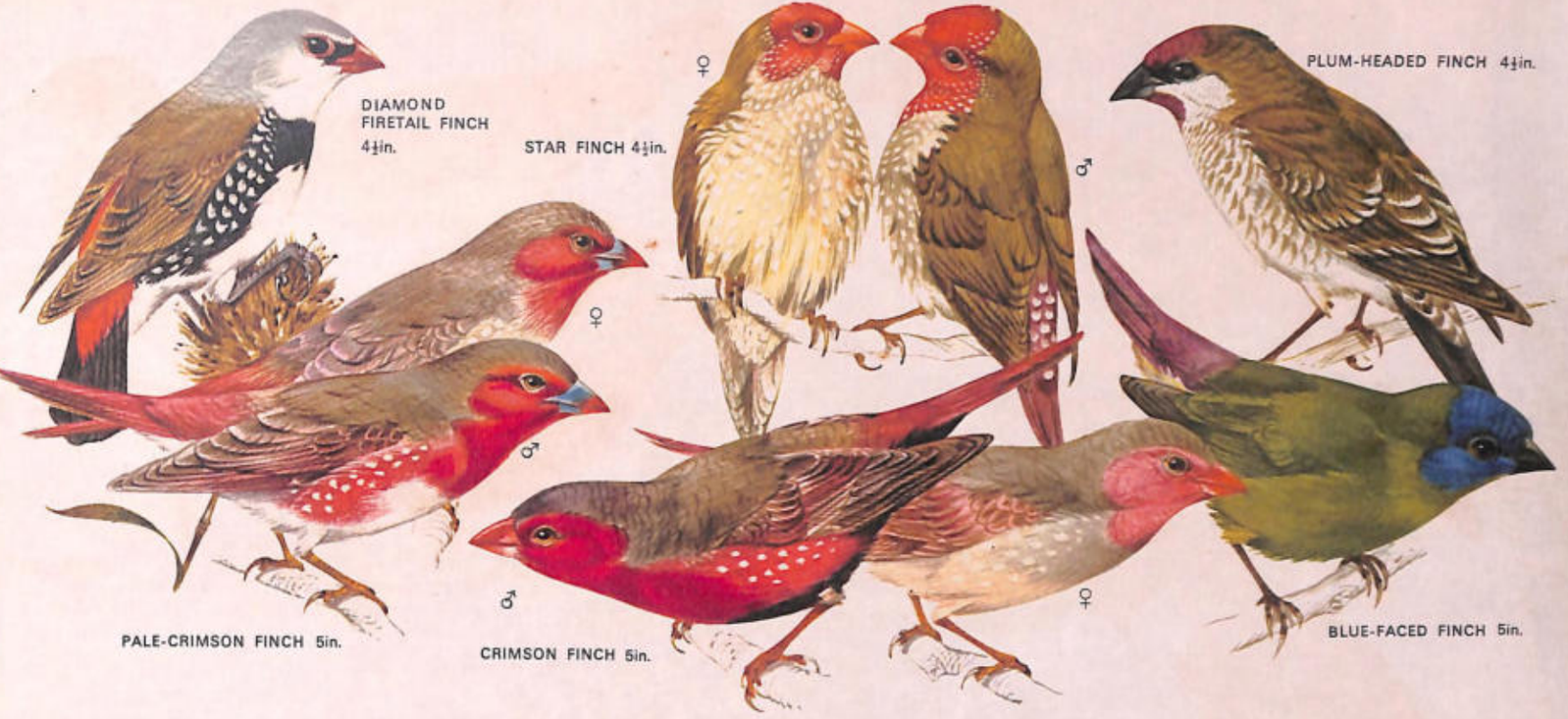
The Pale Silvereye, *Z. albiventris*, is confined to islands in the Torres Strait and islands off the north-east coast of Queensland.

So far as has been ascertained, the habits of these island birds are very much the same as their mainland relatives. The nest is also typically silvereye but the eggs are a much paler blue-green.

The Yellow Silvereye, *Z. lutea*, is found from Shark Bay in Western Australia along the coastal districts to the Norman River in Queensland. These rather yellowish-looking silvereyes are found in the mangroves and contiguous scrub.

They are active little birds, making a bright spot of colour as they search amongst the grey-green mangrove foliage for insects. Outside the breeding season they travel in small flocks. The call is a series of quiet but tinkling notes.

A small, neat fibrous cup-nest is built in the forked branch of a mangrove tree. Three pale bluish-green eggs are laid and the breeding season is thought to be from about September to January.




## PLOCEIDAE

### Old World Seedeaters

The last family in the Passiformes is the *Ploceidae*, collectively known as the Old World Seedeaters. It is a large group containing approximately three hundred and seventy-five species found in many parts of the world. These fall into three well-differentiated groups, the goldfinches and their allies, *Carduelinae*, the waxbills, *Estrildinae*, and the weaver-finches, themselves divided into four groups.

The birds within each of these broad groups show definite family affinities of behaviour and anatomy. While they share enough features in common to show kinship, some taxonomists and ornithologists feel that further knowledge will bear out the theory that the three groups sprang from quite different parent-stock in different parts of the Eastern Hemisphere; which would mean that each group would appropriate full family rank.

All the finches native to Australia are in the same group; just what relationship this group has with the other finches is to some extent a matter of opinion. In the classification which this present work has followed hitherto, the Australian finches are considered to be in the sub-family *Estrildinae*, as a branch of the sub-family called waxbills. Other authorities have called these birds *Estrildinae*, but placed them as a sub-family of the weavers, *Ploceidae*.

A third, recent and authoritatively specific opinion is that of Klaus Immelmann. Immelmann came to Australia specifically to study the native finches and published a book on the subject in 1965. For various reasons, such as differences in anatomy, plumage markings and behaviour, he gives them full family rank as *Spermestidae*, or grass-finches, which feed mainly on grass seeds, are ecologically related to grass areas and which build their nests with grass, but in a manner quite different from the *Ploceidae* or true weaver-finches.

Considering the variety of highly informed taxonomic opinion, this present work can only present them as 'Australian Grass Finches' with the slight comfort that they are at least all in the same group, however, this group may prove to stand in relation to the other finches.

As well as the indiginous species there is one introduced 'grass-finch' from South-east Asia and the four introduced British birds: the House and the Tree Sparrow, the Goldfinch and the less common Greenfinch. Of the four British birds, the gold and the greenfinch are in the sub-family *Carduelinae*, and the two sparrows are in the *Passerinae*, a sub-family of the weaver-birds.

#### *Carduelinae*

The Goldfinch, *Carduelis carduelis*, is a well-known European and British bird, which is now found in many parts of Australia. In this country it ranges from south-eastern Queensland, down the eastern states to Victoria and southern South Australia. These pretty finches are also found in Tasmania and there is a separate population in the south-west corner of the continent.

This bird was introduced into N.S.W. and Victoria originally, but has thrived and multiplied to become a very common species. In the main, they have remained in the vicinity of man, frequenting farm-lands and orchards of all kinds, as well as parks, gardens and areas of waste-land in or near the suburbs. They only rarely nest in native trees, the ti-tree being a notable exception.

The Goldfinch has a delicate twittering song and a twittering flight-call, which often seems to be uttered in rhythm with its undulating flight. The species is not considered to be harmful, as it is a seedeater, with a special liking for thistles and other rough herbage.

A very neat cup-nest is built, of plant-fibres well felted together and thickly lined with vegetable-down. The usual site is in the forked branch of a thick, low bush or tree.

The usual clutch consists of five eggs, and these are a pale bluish-green to pale bluish-white, speckled with browns, mainly about the larger end. October to January are the main breeding months, but some birds nest rather later.

The Greenfinch, *Chloris chloris*, is a related finch, in a different genus. They have not done as well as the Goldfinches as colonisers of their new country, thus they are not as common nor so widely spread. Their main stronghold is in Victoria although even there they are not particularly common. From Sydney the birds have spread inland to Bathurst, and in South Australia Greenfinches may be seen in and around Adelaide and in parts of the south-east.

They are shyer than the Goldfinches and tend to be seen singly and in pairs, although small numbers sometimes gather out of the breeding season. A few may also be seen occasionally mixing with the feeding flocks of Goldfinches.

The call is a monotonously repeated 'dzweee'; a simple, summery sound, distinctly buzzing, and often preceded by a short rising scale of quick 'tizzing' notes. They also have a harsh twitter sometimes uttered in flight.

Their diet consists of various seeds and insects and they are considered to be a harmless species.

They build a cup-shaped nest, reminiscent of the Goldfinche's but more rugged, with a few twigs and some

moss added. It is usually lined with rootlets and feathers, and placed in a thick bush or tree at heights up to about thirty feet from the ground.

The four to six eggs are dull white to a pale greenish-blue, spotted thinly with browns and pale violet. The breeding season is from September to January.

The House Sparrow, *Passer domesticus*, was introduced from Britain in 1862. It was regarded in a somewhat different light light in those days when it was considered a serious offence to shoot a precious sparrow! But by the turn of the century, it had prospered to such an extent that it was becoming a pest and spreading rapidly.

The bird is too well known to require much description. Its depredations amongst soft-fruits, seedlings and flowers, and the way it usurps the nesting-holes of more desirable native species, has made the sparrow unpopular with many people.

Perhaps if they could be reduced these finches would enjoy more favour, for they do have a cheerful and bold air about them and a lively chirping call, especially on sunny spring and summer mornings.

The nest is a shameful piece of housekeeping, being a great untidy bundle of grass, straw, pieces of string, paper and other rubbish, crammed into any available crevice or hole in a tree or building.

The eggs vary a great deal in ground colour, from white to various shades of grey, some being quite dark. These are speckled in varying degrees with greys and browns. Breeding will take place at any time in mild weather, but spring and summer are the main seasons.

The Tree Sparrow, *P. montanus*, is nowhere near as common as the House Sparrow, and is found sparingly distributed in parts of Victoria and southern N.S.W.

Actually the bird is more numerous than many people suppose, but its close similarity to the House Sparrow, and its habit of mixing with them helps the shyer bird to pass unnoticed. They may always be told apart by their brown caps, compared with the grey crown of the House Sparrow. Tree Sparrows also have a black spot on each white cheek, which is quite noticeable when the birds are in summer plumage.

They do not seem to be spreading very much into the country, preferring the cultivated trees of parks and gardens. These finches feed on seeds, small fruits and insects.

The nest is similar to that of the House Sparrow but there is usually less of it. Tree Sparrows prefer holes in trees to breed in, but will also occupy suitable cavities in buildings.

Four to six eggs are laid. These are variable in ground colour and speckling, but tend to be browner than the other sparrow's eggs; they are also glossy. The breeding season is from September to January.

The genus *Zonaeginthus* contains the three firetails.

The Firetail Finch (or Beautiful Firetail), *Zonaeginthus bellus*, is found in the coastal areas of N.S.W. as far north as Newcastle, and down into Victoria and south-eastern South Australia. This finch is also found on Kangaroo Island, and is the only native finch to cross through the Bass Strait islands into Tasmania, where it is quite common.

In pairs of small parties, they frequent heathy country, swampy terrain, open forests, and low scrub. These finches are rarely seen far from water of some description. In Tasmania, they are less confined to coastal areas.

Their flight is direct, and when flushed from the ground, where they obtain a good deal of their food, they go off with a whirr of wings like minature quail. They are not easily put up, however, trying to hide in the grass as a first resort. Their call is a penetrating and mournful 'wee' and a descending call of 'tee-tee-te-te-te-te'.

A nest shaped like a bottle on its side is built, composed of fine dry grasses and green grass, interwoven with a few leaves. It is built in the thick foliage of a bush or low tree. Outside the nesting season, these finches build unlined roosting nests, which more or less lack the entrance tunnel (the 'neck of the bottle').

Five eggs are the usual clutch, but as many as eight may be found. The breeding season is from September to January and it seems likely that the birds are double-brooded.

The Red-eared Firetail Finch, *Z. oculatus*, is restricted to south-western Australia along some of the coastal districts from Esperance westwards, with various gaps in its distribution.

These birds may be found in various habitats such as heavy scrub, forests and paper-bark swamps on the coast. They are territory-conscious birds, and unlike the other native finches, tend to remain in pairs even outside the breeding season.

The common call of these finches is a mournful 'oowee' which may be uttered once or a number of times. They also have a variety of other calls.

A neat, bottle-shaped nest is built of grass, rootlets and plant-tendrils strongly woven together. The entrance-neck to the nest may be as much as seven inches long. The site varies in height, from fifteen to fifty feet up, and on an average, is higher than the nests of other Australian finches.

Four to six white eggs are laid and the breeding season is from September to January. Both sexes take turns in brooding the eggs, and in a good season two broods may be reared.

The Diamond Firetail Finch, *Z. guttatus*, is found from south-central Queensland to South Australia, west to the Eyre Peninsula, and also on Kangaroo Island. This species inhabits open park-like country with scattered timber, mallee, open forest and farms and orchards.

They appear to be a sedentary species, and will even nest in the same tree in consecutive seasons. Outside the breeding season these finches can be seen in flocks of up to thirty or so.

The flight is strong and slightly undulating, and when flushed from the ground, the birds' wings whirr quite loudly. Much of their time is spent upon the ground in search of grass and other plant seeds.

The nest is shaped like a bottle on its side, and is built of grass with sometimes a few twigs and rootlets. Like the other *Zonaeginthus* finches, this bird shows a preference for long pieces of grass as nest-building material; Immelmann found one piece twenty-nine inches long in a nest. The usual site is a thick low bush or in the thick foliage of a tree, although they may build in an old stick-nest of a larger species. Sometimes a number of these birds will nest together in the same tree, a little colony might contain up to a dozen nests or more. At night, both birds sit in the nest.

From four to nine white eggs are laid, with the usual clutch being five or six. The breeding season is August to January, and often even later.

The Painted Finch, *Emblema picta*, has penetrated perhaps more than any other finch into the arid central regions of Australia. It is found from western Queensland across to the southern Kimberleys, and down to the mid-western coast of the continent and northern South Australia.

In pairs, or in small flocks of up to twenty birds or so, these finches are a typical species of the spinifex country. Stony slopes with a little grass cover are preferred, but they also frequent the spinifex-plains. These finches are also usually found within reach of water, and the pools in the inland gorges appear to have their year-round population of Painted Finches.

They are strong fliers, travelling close to the ground as a rule, in an undulating movement. Painted Finches feed on the ground, picking up seeds from around the clumps of grass. A loud and harsh call of 'tiik' or 'trut' may be heard from these birds in flight; a similar but quieter call is used between the birds as they feed, and the female has a rather staccato alarm-call. They also have a song, used in courtship and also performed by a solitary bird, which has been described as 'che, che, che-che-che-che-che, werreeeee-wooeeeee', repeated a number of times.

A rather poorly-constructed globular nest is built, of small twigs, grasses, spinifex stalks and rootlets. It is lined with plant-down, feathers, or other soft materials. The usual site is in dense clump of grass, one or two feet off the ground. Under the nest the birds first build a foundation of pellets of earth, bark, twigs and a few small stones. Unlike many of the grass-finches, this bird does not build a separate sleeping nest; nor does the male share the breeding nest with the female, but roosts on the ground nearby.

Four white eggs are usually laid; clutches of three and five are also found. The breeding season is related to rainfall; the birds breeding after good rains have revived the vegetation.

The Crimson Finch, *Neochmia phaeton*, is found along coastal Queensland from Cape York down to the region of Rockhampton. Westwards, it extends across the coastal districts of the Northern Territory to about Derby in Western Australia. This finch also occurs in New Guinea.

There are two distinct forms of this finch. A black-bellied one is the main Australian race, whilst a white-bellied form is found on Cape York Peninsula and in New Guinea, and called the Pale-crimson Finch, *N. albiventer*.

This species is particularly closely associated with water; consequently, this limits their numbers. The good grass and pandanus palm thickets along water-courses are the typical habitats of the Painted Finch. They have also taken readily to the grass and water unwittingly supplied by settlement, and frequently live and breed in the vicinity of farms and other habitation.

Seeds, insects and a little green vegetable matter form the diet of these finches; much of their food is obtained upon the ground but they also forage through foliage for spiders and insects.

The call is a penetrating sibilant call, somewhat like that of the Painted Finch. A low rasping song with a closing cadence of three melodious descending calls may also be heard.

Nests are usually built on the butt-end of pandanus palm-leaves, from a few feet up to fifty or so above the ground. Occasionally a hollow branch, a tussock or some prominence on a tree may be chosen as a site. In the case of birds living near human habitation, this finch seems to prefer nesting in buildings, under eaves, on various ledges and even inside rooms on occasion.

A bulky nest, domed, but without an entrance-tunnel, is built. In front of the side-entrance hole, there is often a platform made of nesting material. Bark, coarse grasses and leaves are used and the nest is thickly lined with feathers. The male bird collects the material and builds the nest either alone or in some cases assisted by the female.

From five to eight white eggs are laid, and the breeding season is from January to June. Both sexes incubate the eggs and assist in rearing the young.

The Star Finch, *Bathilda ruficauda*, is distributed from about Rockhampton to Cape York, and westwards to the Kimberleys, thence down to the Ashburton district in Western Australia. Occasionally, in the east, they have been recorded as far south as N.S.W.

The Queensland birds show a great variety in plumage pattern, both in colour and the size and number of white spots. Geographic races are, therefore, hard to determine; Keast, however, breaks them up into two races, the 'typical' one *B. r. ruficauda*, found in southern Queensland and *B. r. clarescens*, over the rest of the distribution. The *clarescens* type being a more olive-green and yellow bird.

Usually found near water, the Star Finch is an inhabitant of tall grasses and rushes growing about swamps and along creeks. They are not as terrestrial as some of the other finches, preferring to move deftly through the grass stalks,

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rushes and twigs, in search of seeds and insects.

Two interestingly different flights are noticeable: single birds undulate in the typical finch-manner, whereas large flocks fly direct and straight, making any changes of direction in unison. The call is 'pslit' and also a quiet song is uttered at times.

A globular nest of dried grass is built, without an entrance tunnel, and placed in a low bush or a tussock. The chamber is well lined with feathers.

Three to six white eggs are laid and the breeding season is very extended, taken over the birds' whole range. Birds have been found breeding in various places, between December and August. The females brood during the night, but both sexes brood during the day, and both birds share the duties of rearing the young.

The Red-browed Finch, *Aegintha temporalis*, is found in coastal districts from Cape York down to Victoria, south-eastern South Australia and Kangaroo Island.

Two main races of this finch are recognized by Keast, the second one being *A. minor*, inhabiting Cape York. In this form the grey of the head, which is paler than in the southern birds, extends down towards the shoulders. The back is also a brighter yellow-olive in contrast to the southern birds which are dark olive-green. The undertail-coverts are blackish in the northern birds, and grey in the southern.

These finches feed both on the ground and in the branches of low bushes. The high-pitched calls 'ssitt-ssitt' and 'ssee-ssee' are distinctive, and are almost continuously uttered as the birds move about in search of food consisting mainly of seeds. The song is a rather rhythmical repetition of the call-notes.

A bulky, bottle-shaped nest is built, with the entrance tunnel to one side. This varies a good deal in length from an inch or two up to six inches. The nest is built of coarse grass, with the inner walls of softer grass. The egg-chamber is thickly lined with feathers, plant-down or other soft material. Simple roosting nests, without the entrance tunnel and usually without lining, are constructed by these finches.

The normal clutch consists of five white eggs; with four and six sometimes recorded. In the north, the breeding season is from about January to April, and in the south, it is from October onwards.

The Blue-faced Finch, *Erythrura trichroa*, is found in north-eastern Queensland from Cape York to the Atherton Tableland. Outside Australia this finch inhabits New Guinea, the Solomons and various other islands.

These birds have a wide range of habitats, from tropical sea-level up to the colder forests in the high mountains. In all environments the bird appears to prefer thick growths, such as scrub adjacent to rain-forest or mangroves. They may be seen in pairs during the breeding season, and in flocks up to about twenty at other times. These finches do, however, appear to be rare in Australia, and little is known of their habits.

A nest found in 1944 was the first breeding record for Australia. This was a pear-shaped nest of curly green moss, plant-fibres, the fungus *Marasmius equicrinus*, and a few dead strands of lawyer-vine. The nest was lined with long coarse grass and built in a fork twenty-one feet above the ground in a thorny trunked sapling. (Described by Marshall from a nest found in March on Mount Fisher.)

Three to six white eggs are laid and the female appears to bear most of the burden of incubation. Both birds feed the young, but not until they are twenty-four hours old. As the young are fed in the darkness of the nest, this delay is probably to allow the development of the iridescent glands, of which the nestlings have two, on each side of the base of the bill.

The Gouldian Finch, *Chloebia gouldiae*, is found in tropical northern Australia, from about Derby in the west to the eastern side of the Gulf of Carpentaria, and down to about 20° south in inland Queensland. There appears to be some nomadism in these finches, with a southern movement during the wet season. Flocks of up to several hundred of these birds may be seen out of the breeding season.

There are three phases of this finch, in which they have similarly-coloured bodies, but may have a black, red or yellow head. This is not a geographic or racial difference and the birds all interbreed. The colour-inheritance of the Gouldian Finch may be studied in the *Avicultural Magazine*, in articles by Southern 1946, and R. Murray 1963.

The ratio of head colours is, black-headed birds are found 3 : 1 over red-headed, and the yellow-headed birds are very rare, being about one in every thousand to five thousand.

These beautiful finches are amongst the least studied of the group, in the wild, and little is known of their habits. They are never seen far from water and their favoured habitat is open grassy country with scattered timber. Gouldian Finches may also be found along the edges of mangroves and other scrub thickets. They are not particularly terrestrial, preferring to climb about in the grass stems, in search of seeding grass-heads and insects. At the beginning of the breeding season the birds become almost completely insectivorous, and they have been observed catching large number of flying termites, flies, ants and other insects (Immelmann).

They are quiet birds, calling seldom, and then only uttering a 'ssitt'. A very high-pitched song, audible over only a few yards, may also be heard. It is a continuous whispering hissing sound interspersed with low clicks.

The nest is very frequently built in a hole, either in a tree or a termite-mound. From four to eight white eggs are laid, in what is usually a poorly constructed grass nest.

Two or three broods are raised in a normal season. The breeding months are from about January to April. Both sexes share incubation duties, and numbers of the birds will often nest in proximity to each other.

The Masked Finch, *Poephila personata*, is found from north of Derby in the west across to Cape York Peninsula, but the exact southern limits of the bird's range is not clear. Keast defines a second geographic race of this bird, found on the eastern side of the Gulf of Carpentaria and on Cape York Peninsula. In this form, the sides of the head are white and there is also a larger patch of white in front of the black on the flanks. The back of the bird is also a more reddish-brown.

Dry, lightly timbered country, and terrain with small scrub and grass, are the typical haunts of the Masked Finch. They seldom stray far from water and have adapted quite readily to human habitation in many areas.

They are highly terrestrial birds, finding their diet of grass seeds on the ground. Small caterpillars and insects such as termites, are also eaten. During the heat of the day they retire up into the shade of thick trees, which is about the only time they will be seen away from the ground. At the beginning of the breeding season these finches become almost entirely insectivorous.

The two main calls are a low communication call of 'twat-twat' and a louder 'tiat'.

A bulky nest of grass is built, either hidden in grass on the ground, or in the branches of a low tree or bush. The entrance hole is to one side; no entrance tunnel is constructed, but there is often a platform at the entrance. Masked Finches never sleep on branches and twigs (Immelmann). An unlined roosting nest is built which the birds use throughout the rest of the year. The breeding nest is thickly lined with soft material such as rabbit-fur or plant-down. A peculiarity of the nest is that quantities of charcoal are often found in with the eggs, and the reason for this is not known although there are various theories.

Its absorbent properties might make it useful for nest sanitation, the same characteristic would help in keeping dry the nests that were built on the ground. It may even be a hygienic measure to absorb gases inside the nesting chamber.

From four to six eggs are laid, and the breeding season is from March to June.

The Long-tailed Finch, *P. acuticauda*, is found from about Derby in Western Australia around the northern coastal regions to about the Leichhardt River in Queensland.

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There is an interesting change in bill-colour with these birds. In the west the bills are yellow, with a gradual change through yellowish-orange to orange-red in the eastern birds.

Dry savannah country—grassy plains with scattered tall trees—is the typical habitat of this finch. Near the coast they may be found in open country dotted with pandanus palms. Grass seeds and insects form the diet of this species, and they often catch such things as flying termites on the wing.

Two distinct calls will be heard from Long-tailed Finches. The communication call is a very quiet 'tet', and the other call is a mournful, ventriloquial 'wurt' or 'tuwurt'.

The nest is a domed structure with an entrance tunnel from two to four inches long. Dried grass stalks and other grasses are used and the nest is sometimes lined with feathers. Occasionally a few pieces of charcoal will be found in the bottom of the nest, but not as much as in the nests of Masked Finches. The usual site of the breeding nest is in the top of a tree or bush, from a few to sixty feet off the ground.

Roosting nests are constructed for use outside the nesting season; these are always much smaller, have no entrance tunnel, and are not lined.

The Black-throated Finch, *P. cincta*, is distributed from Cape York and Normanton down to northern N.S.W. There are, according to Keast, three acceptable forms of this bird.

The form *cincta* is found from N.S.W. to Inkerman in Queensland; the Black-rumped Finch, *P. c. atropygialis*, from the Cairns to Normanton districts, differs mainly in having black upper tail-coverts, a richer fawn on back and breast and a paler grey on the head; *P. c. nigrotecta* from Cape York is a deep brown colour on the front, without the reddish tinge.

The Black-throated Finch is a very close relative of the Long-tailed Finch and is similar in its habits, although the Black-throated prefers more densely covered habitats as a rule, and is usually found in the vicinity of fresh water. They remain fairly shy birds, and have not remained where human habitation has spread to any extent.

Grass seeds and a few insects form the diet of this finch, and it is largely terrestrial. The calls of this bird and the Long-tailed Finch are almost identical. A domed grass nest is built, with a side-entrance and a tunnel. It is lined with feathers or plant-down. Roosting nests, without lining or tunnel, are built for use outside the breeding season. The breeding nest may be built into the forks of a eucalyptus at heights from about six feet to forty feet from the ground. The birds also frequently build against the disused stick-nest of a hawk. Holes in termite-mounds or hollow branches are sometimes used.

From five to nine eggs form the clutch and breeding takes place soon after the rains in the north, from about January to April or later. In the southern parts of this finch's range it generally breeds from August to January.

The Double-barred Finch, *Stizoptera bichenovii* is distributed from central-western N.S.W. up to Cape York; westwards it ranges through the Northern Territory to Roebuck Bay on the west coast. This species has two distinct colour types, which are recognized as geographic races. *Stizoptera bichenovii* is the eastern bird, found in N.S.W., Queensland and Cape York. The western form, *S. b. annulosa*, takes up the western sectors of the distribution, and differs in having the rump black instead of white. In parts of the Northern Territory there is a hybrid population with some black-rumped birds and others with a variable amount of white feathering (Keast).

The Double-barred Finch frequents a wide variety of habitats. Pandanus groves and the rank grass along creeks are a common haunt, but these birds are also met with on dry, lightly timbered plains, although seldom more than a mile or two from water. These finches have taken very much to living in the vicinity of man.

They are largely terrestrial, where they obtain most of their food, occasionally moving up into the grass stems and low bushes. Seeds of various grasses and herbaceous plants are taken and also some insects are eaten.

A low 'tat-tat' communication call may be heard and a louder identity call of 'tiaat-tiaat'. Infrequently a low rather trilling song is uttered during the breeding season.

The nest tends to be globular rather than bottle-shaped, and has only an inch or two of entrance tunnel. It is rather roughly-built of dry grasses and grass stalks. The nest is lined with soft material and Immelmann found an interesting tendency for lining to be different in the nests of the two races. The western population lined their nests with soft grass or plant-down, even when feathers were available, whereas the eastern birds always thickly lined their nests with feathers. A small roosting nest is constructed outside the breeding season, without an entrance tunnel or lining.

The site for the breeding nest varies; it is usually in the outer twigs of a branch with no attempt at concealment. Low bushes, eucalypts, acacias, and pandanus palms are all used, also cane-grass and cultivated shrubs in gardens.

Four or five eggs are laid, and the breeding season varies in different districts, after rains as a rule in the north, and nests will be found at practically any time, except the middle of winter, in the south.

The Zebra Finch, *Taeniopygia guttata*, is found throughout most of Australia except for the wet coastal forest areas. This bird is by far the most common of our finches and is found in a wide variety of habitats. In pairs during the breeding season, or otherwise in flocks (made up of birds which seem to pair for life), these finches feed on or near the ground, mainly on seeds, supplementing this diet with insects.

There is a variety of calls uttered by these birds. The communication call is a low 'tet-tet' heard almost constantly as the flock moves along. A loud rather nasal 'tia' is the flight-call, and an aggressive call of 'wisst', like the sound of tearing cloth, is used when the finch chases another bird. The song is low, with somewhat ventriloquial trills being interspersed with the identity call (Immelmann).

A poorly-built nest of grasses is made, sometimes with a few small twigs and rootlets. The egg-chamber is lined with soft material of various kinds. Very many other situations are chosen to breed in. Holes of different kinds—even a rabbit burrow, in under the large stick-nests of birds of prey is also quite a common site, and the old nests of smaller species will be utilized.

When these finches build their own nest, it may be in a thick prickly bush or in a tree up to thirty feet from the ground. Outside the nesting season, simple roosting nests are constructed.

Three to seven white eggs are laid, and the birds breed in various localities in a good season at any time of the year, except the middle of winter. Both sexes build the nest, brood the eggs, and feed the fledglings.

The Plum-headed Finch, *Aidemosyne modesta*, is found from the vicinity of Cairns in Queensland down the eastern savannah belt to southern and central N.S.W.

This is not a common finch and it occurs irregularly even within its range. The species is very closely tied to water, and comes to drink at least every hour, thus they are never seen far from the vegetation bordering creeks or some other water.

The Plum-headed Finch is somewhat nomadic, its movement being related to the availability of water. They are usually seen in pairs or small flocks, although several

hundred have been recorded in some gatherings.

Single birds and pairs are inclined to be silent, but as the numbers increase, so does their vociferousness. The communication call is 'tlip' or 'tleep', uttered frequently as a group of birds feeds upon the ground, preens on a branch-perch and sometimes in flight. A louder sound is the identity call 'pyiit'. A strange little song is also uttered, its start so high as to be almost inaudible, but as the song progresses it becomes a louder trilling and ends with a few flute-like notes.

A flattened, oval-shaped nest is built, of green grass, with a tiny entrance hole to one side. It is usually placed in a tussock or a low bush and is within three feet or so of the ground. Four to seven white eggs are laid, and the breeding season is usually from September to January.

The Spice Finch, *Lonchura punctulata*, was introduced into Australia about 1940, near Brisbane. Ten years later it had appeared in Sydney, and both of these occurrences were from aviary escapees. They do not appear to be spreading rapidly from the vicinity of these two cities, but are increasing further north on the Queensland coast around such places as Townsville, Innisfail and Cairns.

This finch seems to prefer settled areas rather than the wilder habitats, and almost takes the place in northern towns that the House sparrow does in the south-east.

The diet of these birds is mainly seeds of grasses and herbaceous plants, and they do not seem to be as insectivorous as many Australian finches. They do have the interesting habit, however, of gathering to feed at the flattened dry carcase of an animal or bird that has been run over by numerous vehicles on a road.

A number of different calls are uttered by the Spice Finch. The identity call is a loud 'kit-eeee', a call similar to this may also be heard at dusk as the birds go to roost. The alarm-call is a creaking 'tret-tret'. There is also a varied, whistling and twittering song.

A compact, globular nest is built, with a side-entrance and a more or less developed hood over the entrance hole. It is constructed of coarse grass and leaves, with a lining of finer grasses. The usual site is in a bushy shrub or tree at heights up to about fifteen feet. Quite frequently these sociable birds will build in colonies, of fifty or sixty nests with about ten feet between the nests. A roosting nest is also built, and a number of birds will often crowd into the one nest for the night.

Four to seven and sometimes eight white eggs form the clutch, and the breeding season is from November to April, and probably during other months in varying seasons.

The Chestnut-breasted Finch, *L. castaneothorax*, is found in northern Australia from about Derby in the west to Queensland and down to about Sydney. How far this bird ranges into the dry interior is not known. Outside Australia this finch is also found in New Guinea.

Thick grass and reeds flanking creeks and swamps, and the mangroves, are the favoured habitats of these birds. Sometimes they gather in large colonies, and have become something of a pest in rice growing areas of the north, and in N.S.W., where they cause considerable damage by eating seeds of various crops.

In northern Queensland, where the introduced Spice Finch is thriving, the Chestnut-breasted Finch is being ousted, and as Immelmann says, 'If this development continues at the same rate the Chestnut-breasted will ultimately be replaced by the Asiatic bird'.

The Chestnut-breasted Finch is not as terrestrial as most other Australian grass-finches. It prefers to pick seeds from the growing seed-head of the grass or crop. They are able to climb up and down the vertical stalks in a very nimble manner.

One main call is heard from these finches, a low 'tit' uttered as a feeding and clock call. In flight the same sound is louder and more drawn out. A high-pitched song, barely audible over a few yards, is also part of the bird's repertoire.

A globular nest of green and dead grasses, lined with wool or fine grasses, is built in reeds, a clump of grass or similar growth. There is no entrance tunnel but a slight hood may be present. No roosting nests are built, the birds retiring into thick grass or reeds at night.

Five or six, but sometimes more, white eggs form the clutch. The birds breed after the rains in the north and in the south nests have been found, in various seasons, at all times of the year except mid-winter.

The Yellow-rumped Finch, *L. flaviprymna*, extends across tropical Australia from about Derby on the west coast to Queensland. The extent to which it ranges inland is not clearly known. This species is one of the least-studied of the Australian finches, and it is considered by many ornithologists to be some kind of a desert form of the Chestnut-breasted Finch, as it appears to be restricted to the more arid areas.

Some nomadism is evident, the birds moving into coastal areas in the wet season. In both their coastal and inland haunts, these finches are usually seen in mixed flocks with the Chestnut-breasted birds. They bathe, feed and even roost together, behaving, in fact, like members of the same species. The diet of the Yellow-rumps is the seeds of various grasses.

The main call is similar to the communication call of the Chestnut-breasted bird, but more piercing. There is also a song which may be sung at the same time by two or more birds.

The nest and the nest-sites appear to be identical to those of *L. castaneothorax*, although the Yellow-rumped Finch is said to sometimes line its nest with a few feathers. The normal clutch consists of four or five white eggs, and the species is double-brooded. The breeding season is from January to March and April. Both birds share the duties of incubation by day and at night the male roosts nearby: no roosting nests are constructed outside the breeding season.

The Pictorella Finch, *Heteromunia pectoralis*, is another tropical finch, found from about Derby in north-western Australia, through the Northern Territory to Queensland. The southern extent of this bird's range is not known.

Open savannah-type country is the chief haunt of these finches, where they may be found spending most of their time on the ground. They seem to prefer the areas around creeks and water-holes, but unlike many of the finches, will also be met with far from any water.

They are rather nomadic little birds, appearing in districts where they have not been recorded for some time, or deserting old haunts suddenly. Flocks of up to two hundred or so birds may be seen, feeding on the gound, or climbing the grass stalks to get at the seed-heads. At the commencement of the breeding season Pictorella Finches become insectivorous to some extent.

A very quiet sparrow-like 'chip' is the chief communication call, whereas the identity call is a piercing 'tlit' or 'tleet'.

An untidy bottle-shaped nest is built, of dried grasses, rootlets and small twigs; there is no entrance tunnel, and the nest may be lined with a few feathers. Four to six white eggs constitute the clutch, and the breeding season is from January to March and April. During the day both sexes take turns in brooding, but at night only the female sits in the nest. The male bird roosts nearby and no roosting nests are built by these finches outside the nesting season.

TIMOR SEA
MELVILLE I.
DARWIN
WEST ALLIGATOR R.
SOUTH ALLIGATOR R.
ADMIRALTY GULF
NAPIER BROOME BAY
WYNDHAM
INDIAN OCEAN
KING SOUND
KIMBERLEY RANGES
DERBY
HALL'S CREEK
FITZROY R.
FITZROY CROSSING
BROOME
ROEBUCK BAY
NORTH
MUSGRAVE RANGES
TANAMI
TANAMI DESERT
GREAT SANDY DESERT
NICKOL BAY
DAMPIER ARCH
PORT HEDLAND
MONTEBELLO I.
BARROW I.
EXMOUTH GULF
North West Cape
ONSLOW
FORTESQUE R.
HAMERSLEY RANGES
Point Cloates
ASHBURTON R.
Lake Mackay
MACDONNELL
Lake Amadeus
MINILYA R.
GIBSON DESERT
AYERS ROCK
GASCOYNE R.
Lake Carnegie
SHARK BAY
CARNARVON
DIRK HARTOGS I.
WILUNA
EVERARD RANG
MURCHISON R.
WESTERN AUSTRALIA
GREAT VICTORIA DESERT
GERALDTON
HOUTMAN ABROLHOS
MORAWA
NULLARBOR PLAIN
OOLDEA
KALGOORLIE
NARETHA
MOORA
EUCLA
DARLING RANGES
NORSEMAN
MOORE R.
Lake Dundas
PERTH
FREMANTLE
GREAT AUSTRALIAN BIGHT
Lake Grace
ESPERANCE
BUNBURY
Cape Naturaliste
STIRLING RANGES
ARCHIPELAGO OF THE RECHERCHE
ALBANY

ARAFURA SEA
TORRES STRAIT
THURSDAY I.
Cape York
PORT MUSGRAVE
WATSON R.
PASCOE R.
PRINCESS CHARLOTTE BAY
ARCHER BAY
Cape York Peninsula
GROOTE EYLANDT
GULF OF CARPENTARIA
CORAL SEA
COOKTOWN
MITCHELL R.
McARTHUR R.
CAIRNS
NORMANTON
ATHERTON
HERBERTON
INNISFAIL
ROCKINGHAM BAY
BARKLY TABLELAND
CARDWELL
GREGORY RANGES
NORMAN R.
LEICHHARDT R.
BURDEKIN R.
GREAT BARRIER REEF
TOWNSVILLE
FLINDERS R.
BOWEN
CLONCURRY
ATHERTON TABLELAND
SUTTOR R.
MACKAY
PACIFIC OCEAN
PERCY I.
BROAD SOUND
QUEENSLAND
FITZROY R.
ROCKHAMPTON
GLADSTONE
SIMPSON DESERT
GREAT DIVIDE
HERVEY BAY
FRASER I.
MARYBOROUGH
OODNADATTA
Lake Eyre
BRISBANE
MORETON BAY
DARLING DOWNS
NEW SOUTH WALES
RICHMOND R.
CLARENCE R.
Lake Torrens
Lake Frome
FLINDERS RANGE
DARLING R.
MACQUARIE R.
GREAT DIVIDE
Lake Gairdner
BROKEN HILL
MACLEAY R.
HASTINGS R.
PORT AUGUSTA
MANNING R.
GAWLER RANGES
LACHLAN R.
PORT STEPHENS
HUNTER R.
NEWCASTLE
CLARE
HAWKESBURY R.
PORT JACKSON
ADELAIDE
MT. LOFTY RANGES
SYDNEY
MURRUMBIDGEE R.
BOTANY BAY
Lake Illawarra
SPENCER GULF
Yorke Peninsula
GULF ST. VINCENT
MALLEE
MURRAY R.
SHOALHAVEN R.
KANGAROO I.
GREAT DIVIDE
VICTORIA
TASMAN SEA
GRAMPIANS
MELBOURNE
PORTLAND
MALLACOOTA INLET
PORT PHILLIP BAY
Wilson's Promontory
KING I.
KENT GROUP
BASS STRAIT
THE SISTERS
FLINDERS I.
PYRAMID
CHAPPEL I.
FURNEAUX GROUP
HUNTER I.
CAPE BARREN I.
ARTHUR R.
BANKS STRAIT
DEVONPORT
LAUNCESTON
MACQUARIE HARBOUR
TASMANIA
MARIA I.
HOBART
PORT ARTHUR
PORT DAVEY
STORM BAY
South West Cape
BRUNY I.

ZOOLOGICAL GARDENS CALCUTTA

# VAGRANTS

With the increase in the number of bird-watchers over the last few years the number of 'new' birds being added to the Australian list is becoming considerable. Some species have only been recorded once, and are probably completely accidental wanderers. Others which are being seen with increasing frequency have probably been coming in small numbers to Australia as seasonal migrants, but have only lately been observed. Listed below are species now officially on the Australian checklist, although I have omitted birds seen only once.

The King Penguin, *Aptenodytes patagonica* is a straggler to Tasmania from the Antarctic islands and Macquarie Island.

The Erect-crested Penguin, *Eudyptes sclateri*, has been recorded as a rare visitor to south-eastern Australia from the sub-Antarctic.

The Royal Penguin, *Eudyptes schlegeli*, is a straggler to Tasmania and South Australia.

There are at least two records for the Corncrake, *Crex crex*. This bird breeds in Europe and Northern Asia and migrates southwards. The most recent record is of one on a ship off the coast of Western Australia in 1944.

Leach's Storm-petrel, *Oceanodroma leucorrhoa*, is a bird of the colder Northern Hemisphere, migrating southwards. There are two records of this bird in our waters: one for New Zealand in 1922 and one for Australia in 1965.

The Grey-backed Shearwater, *Puffinus bulleri*, has been recorded a number of times off the coast of N.S.W. It breeds on islands off New Zealand and migrates to the north Pacific Ocean.

The White-chinned Petrel, *Procellaria aequinoctialis*, is an occasional wanderer to southern Australian coastal waters from the sub-Antarctic.

The Antarctic Petrel, *Thalassoica antarctica*, is a rare visitor to southern Australian seas from the Antarctic.

Brown-headed Petrels, *Pterodroma melanopus*, breed on Lord Howe Island and occasionally reach south-eastern Australia.

The Snowy Petrel, *Pagodroma nivea*, breeds in Antarctica and is occasionally recorded off southern Australia.

The Royal Albatross, *Diomedea epomophora*, breeds on islands off New Zealand. Similar in general appearance to the Wandering Albatross, this bird may be distinguished by its prominent swollen nostril tubes and a dark cutting-edge to the bill.

Common Tern, *Sterna hirundo*, breed in the Northern Hemisphere and migrate southward.

The Arctic Tern, *Sterna macrura*, breeds in the Northern Hemisphere and migrates southward as far as Antarctica. It has been recorded from Western Australia, South Australia, Victoria and Tasmania.



The Grey Noddy, *Procelsterna cerulea*, breeds on various Pacific islands and has been recorded from eastern Australian seas.

The White Tern, *Gygis alba*, breeds on islands in tropical and sub-tropical oceans.

The South Polar Skua, *Catharacta maccormicki* is sometimes recorded in Australian seas. It is regarded by some ornithologists to be a form of the Great Skua of the Northern Hemisphere.

The Caspian Plover, *Charadrius asiaticus*, has been recorded in Australia, although it is considered by some authorities to be conspecific with our Oriental Dotterel.

Several Long-toed Stints, *Erolia subminuta*, were seen in Victoria in January 1966. It is not unlikely that this species could be a spasmodic migrant to our shores.

The Pectoral Sandpiper, *E. melanotus*, has been recorded from N.S.W., Victoria, Western Australia and Tasmania.

Various sightings are on record of the Buff-breasted Sandpiper, *Tryngites subruficollis*, from both N.S.W. and Victoria.

The Ruff, *Philomachus pugnax*, has been recorded from Western Australia, South Australia and Victoria.

The Red-necked Phalarope, *Phalaropus lobatus*, is another Northern Hemisphere wader that has been seen a number of times in Victoria.

Glossy Swiftlet, *Collocalia esculenta*, is accidental to Australia and has been recorded only from Cape York.

The Uniform Swiftlet, *Collocalia vanikorensis*, inhabits islands to the north of Australia and is sometimes recorded from Cape York Peninsula

The Barn Swallow, *Hirundo rustica*, the common swallow of Europe and other parts of the Northern Hemisphere, has been seen in some numbers near Derby and once on Cape York. Like many of these rarely noticed birds, it is quite possibly a regular migrant.

White-throated Babblers, *Pomatostomus halli*, are a new species, discovered by a British Museum field party, near Langlo Crossing, south-western Queensland, in 1963.

The Streaked Grass-warbler, *Cisticola juncidis*, has recently been recorded in the Northern Territory and northern Queensland. It is similar to the Golden-headed Fantail-warbler in general habits. This bird has now established itself as a breeding species.

The Yellow Wagtail, *Motacilla flava*, has reached Australia occasionally from Asia. One bird was seen in Queensland in 1905, but more recently in 1965 several were recorded from near Innisfail, Queensland. There is also a record from Western Australia in 1960.

The Colombo Crow, *Corvus splendens*, appears to have reached our shores on ships from Asia and the South-east Asian islands. It has been recorded on several occasions from Western Australia, and in 1959 from Victoria.

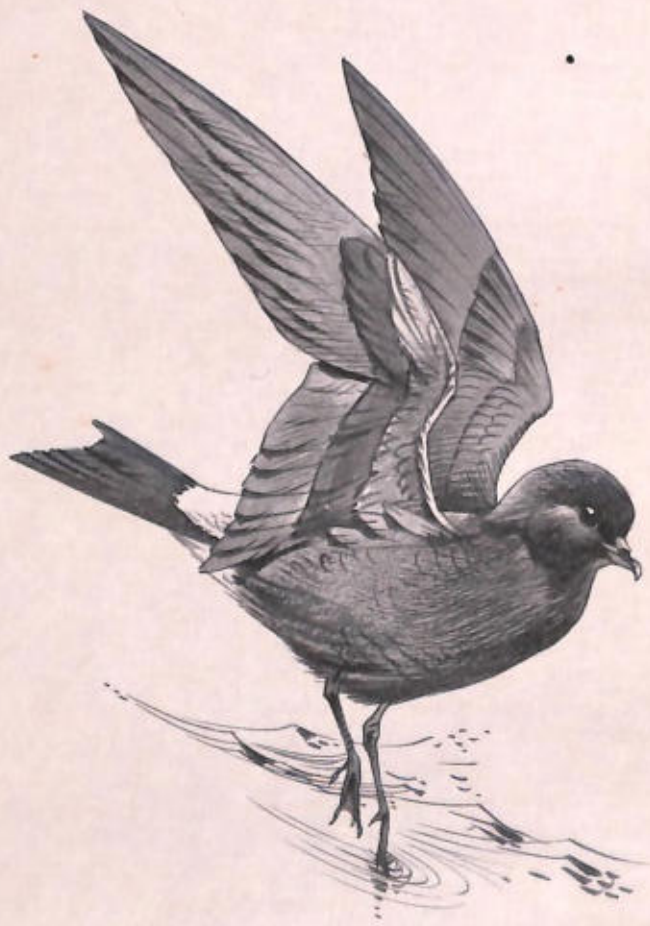
ZOOLOGICAL GARDEN
CALCUTTA
ALIPORE

KING PENGUIN 38in.

# CORRIGENDA

| *Page* | *Column* | *Line* | |
|---|---|---|---|
| 3 | Right | 27 | for *Casuaris casuaris* read *Casuarius casuarius* |
| 6 | | | captions for Rockhopper Penguin and Thick-billed Penguin have been transposed |
| 7 | | | size for Little Penguin should be 8in. |
| 9 | Right | 1 | for *Diomeda* read *Diomedea* |
| 9 | Right | 22 | for *D. chlorohynchus* read *D. chlororhynchus* |
| 11, 12 | | | for Kerguelan read Kerguelen |
| 12 | | | caption should read White-bellied Storm Petrel |
| 12 | Left | 28 | for Aukland read Auckland |
| 12 | Left | 47 | for *caernlea* read *caerulea* |
| 15 | Left | | for PELICANIFORMES read PELECANIFORMES |
| 20 | Right | 6 | for *Phoethon* read *Phaethon* |
| 21 | Left | 37 | for *Buturides* read *Butorides* |
| 21 | Right | 14 | for *Threskiornidae* read *Threskiornithidae* |
| 21 | Right | 64 | for *pictata* read *picata* |
| 25 | | | caption Immature applies to lower bird |
| 27 | Left | 36 | for *Anserratinae* read *Anseranatinae* |
| 29 | Right | 17 | for Shovellers read Shovelers |
| 30 | | | female Whistling Tree Duck is on left |
| 31 | | | male Blue-billed Duck is on right |
| 32 | | | sex signs for Maned Goose have been transposed |
| 32 | Right | 61 | for cone read cere |
| 34 | Right | 19 | for *Hieraetus* read *Hieraaetus* |
| 36 | Left | 36 | for *morthnoides* read *morphnoides* |
| 40 | Right | 20 | for *melanosternon* read *melanosterna* |
| 60 | Left | 64 | for Pomorline read Pomarine |
| 61 | Left | 26 | for Caspian Tern add specific name *Hydroprogne caspia* |
| 61 | Left | 31 | for Gull-billed Tern the specific name is *Gelochelidon nilotica* |
| 62 | Right | 19 | for *tricolour* read *tricolor* |
| 62 | Right | 6 | should read—but without the black on the sides and back of neck. |
| 63 | Left | 4 | for *C. asiaticus* read *C. veredus* |
| 63 | Right | 34 | for *C. cinctus* read *Erythrogonys cinctus* |
| 64 | | | captions for Spurwinged Plover and Banded Plover have been transposed |
| 66 | Right | 12 | for *cineveus* read *cinereus* |
| 66 | Left | 35 | for *stagnatalis* read *stagnatilis* |
| 85 | Left | 18 | for *phasinella* read *phasianella* |
| 112 | Right | 24 | for *narathae* read *narethae* |
| 130 | Left | 9 | for *plumifera* read *plumiferus* |
| 146 | Right | 55 | for *tenuirostre* read *tenuirostra* |
| 146 | Right | 37 | for *lencomela* read *leucomela* |
| 198 | Left | 59 | for Rusty Field-wren add specific name *C. isabellinus* |
| 268 241 | Left | 33 | for *Manhorina* read *Manorina* |

SPECIES OMITTED FROM MAIN TEXT



LEACH 'S STORM-PETREL 8½in.

Lesser Noddy, *Anous tenuirostris*, is found along the coasts and offshore islands around mid-western and north-western Australia. Like the other noddies they are usually in large flocks. The only known breeding place of these birds in Australian waters is on the Houtman Abrolhos Islands.

This tern is very similar in the field to the Common-Noddy but may be distinguished chiefly by its proportionately longer and thinner bill.

A substantial platform-nest of seaweed is built in a mangrove. The shallow depression which carries the egg and the rest of the nest soon becomes covered in the sun-baked guano. One egg is laid which is a dull white with

a few reddish-brown markings. The breeding season is from September to December.

The White-capped Noddy, *A. minutus*, is a tern of the tropics and in Australia it frequents the coastline and islands from the Northern Territory to Queensland. Usually in large flocks, they are seldom seen far from their island haunts. They roost in the vegetation each night and at dawn go off in clamorous flocks to fish beyond the reefs.

This tern, like its relatives, breeds in large colonies, and builds a flat platform-nest of leaves cemented together with guano. These nests are crowded together on the branches of low trees and bushes; and on rare occasions the birds may be found nesting on the ground. One buff-white egg is laid which is spotted and blotched with purplish-grey. The breeding season is from September to December.

The White-winged Black Tern, *Chlidonias leucoptera*, has a wide distribution from central and southern Europe across central Asia and migrating down to Africa, the South-east Asian islands and northern Australia. In this country it occurs regularly as far south as Perth and Sydney, but further south it is rare.

They are irregular visitors to our shores during the spring and summer months. Estuaries, coastal lagoons and the beach are their habitats. They do not breed in this country.

The Marsh Tern, *C. hybrida*, is, unlike most terns, a bird of the inland waterways and large lakes. They fish and hunt for aquatic insects and are an unexpected and charming sight as they fly gracefully over the rushes and open water.

Their range is throughout most of Australia and Tasmania where suitable habitats occur. A flattish nest of aquatic vegetation is built, usually floating upon the water and anchored to a few reeds.

Two or three eggs form the clutch and these are greenish-buff, blotched with black and brown over paler grey markings. The breeding season is from October to December.

The Song Thrush, *Turdus philomelos*, was introduced into Victoria in about the middle of the last century. In the 1860's it was introduced into Queensland and N.S.W. but has not notably thrived anywhere except about Melbourne. It is a useful bird about the gardens, taking many snails and other pests, and contributes a fine rich voice to suburban bird-song.

A bowl-shaped nest of grass, rootlets, straw and similar materials is lined with mud, and built into the forked branch of a thick bush or low tree. Three to five deep sky-blue eggs are laid which are spotted with black and dark brown. The breeding season is from September to January.

The Blackbird, *T. merula*, is found from central eastern N.S.W. down through Victoria to Tasmania and South Australia. Introduced in the 1860's this well-known bird has thrived much more than the thrush. It has become very common in parks and gardens and has spread to many country areas. In some localities particularly in Tasmania the bird has become a considerable pest in soft-fruit orchards.

The nest is similar to that of the thrush but larger. The reinforcement of mud or cow-dung is lined with soft grasses or other fine material. The usual nesting-site is in a thick bush, quite frequently an introduced variety.

Three to five bluish or grey-green eggs are laid which are well speckled and spotted with brown. The breeding season is from September to January.

The Shining Flycatcher, *Piezorhynchus alecto*, is a tropical bird, found around our northern coasts from Point Torment in the west to Hervey Bay on the Queensland coast. Mangroves, ti-tree swamps and other thick growth along creeks and swamps are its favoured haunts.

This flycatcher has a melodious trilling song and a drawn our 'cheeee'. Insects caught on the wing or snapped up from the branches and margins of streams form the bird's diet.

A neat cup-nest is built of bark and lichen bound together with spider-webbing. The nesting-site is a thin branch quite frequently overhanging water. Three greenish-white, brown-spotted eggs are laid. The breeding season is from October to February.

The Dusky Honeyeater, *Myzomela obscura*, is distributed through coastal northern and eastern Australia from the Kimberley district to Fraser Island. Mangroves, other swampy vegetation and the contiguous scrub, are the haunts of this bird.

A small and delicate nest is built of thin grasses, a few rootlets and animal hair. It is suspended from the thin, drooping twigs at the end of a leafy branch. Two eggs form the clutch, and these are white with a pinkish tinge and spotted minutely with red and purplish-grey. The breeding season is from September to December.

The Thick-billed Grass-wren, *Amytornis modestus*, is found in the interior of north-western N.S.W., northern South Australia and the Centre. In pairs or small parties they frequent the scrubby vegetation of dry sandy creeks, bluebush and spinifex. The habits and nesting procedures appear to be indistinguishable from those of the other grass-wrens. It breeds after good rains.

The White-eared Grass-finch, *Poephila personata leucotis*, is a geographic form of the Masked Finch. It is found on Cape York and the eastern side of the Gulf of Carpentaria. The sides of the head and throat are white and the back of the bird has a reddish tinge. The bill is paler than that of the Masked Finch and there is a patch of white in front of the black flank-patch. Its habits and life history appear to be similar to those of the Masked Finch.

# BIBLIOGRAPHY

The following bibliography lists all the publications referred to in the course of writing the present volume. Some of these works are of particular importance as they have been the basis for various aspects and sections of *Australian Birds*, and I should also like to take this opportunity of thanking the various authors for whatever use I have made of their books.

*The Mallee Fowl* by Dr H. J. Frith was the basis of my section on this bird. Brigadier Hugh R. Officer's excellent book on the honeyeaters was of great value in dealing with this group—the notes on nesting and distribution being particularly useful. *Australian Finches* by Klaus Immelmann was largely referred to for the finches. For the waterfowl, the group-monograph *Waterfowl in Australia* by Dr H. J. Frith was used. *The Lyrebirds of Sherbrooke* by Dr L. H. Smith provided a number of facts and anecdotes about these interesting birds. Except for where species have been more thoroughly dealt with in monographs or regional studies N. W. Cayley's *What Bird is That* was taken as a basis for information on distribution and nesting.

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## PAPERS

As well as using books for reference, I have referred to many papers published in a variety of scientific works. Some of these, in particular, are recommended for further reading on some difficult groups of birds.

For example, the nomenclature and the classification of the whistlers (*Pachycephala*) and the yellow robins (*Eopsaltria*) have been altered a number of times over the past few years. Changes have been as great as moving the Little Yellow Robin out of the *Eopsaltria* altogether and classifying it with the *Microeca* flycatchers.

For further reading on the *Pachycephala* see:


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The *Eopsaltria* have been treated in:


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Certain of the taxonomically difficult pardalotes have been dealt with in:


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